AVIATION WEEK
A McGRAW-HILL PUBLICATION
AUG. 23, 1948

Silver tray awarded to the winner of the Goodyear Trophy Race

The Second Annual Goodyear Trophy Race

At the National Air Races in Cleveland, September 4, 5 and 6, The Goodyear Tire & Rubber Company will sponsor the second annual Goodyear Trophy Race for light airplanes with $25,000 in prizes. Goodyear sponsors this race with the belief that competition will best serve to stimulate engineering progress, design research, and promote public interest in light aircraft. Goodyear, Aviation Products Division, Akron 16, Ohio or Los Angeles 54, California.

NATIONAL AIR RACES 1948 CLEVELAND SEPT 4 5 6

GOODYEAR AVIATION PRODUCTS

MORE AIRCRAFT LAND ON GOODYEAR TIRES

AT high altitudes ordinary electron tubes can develop electrical 'leaks' between the base pins. Honeywell recognized this detail as a vulnerable point in dependable aircraft operation—and did something about it! We designed a special tube base with barriers between pins, both inside and outside the base, to create a longer "leakage path"—safe resistance for higher altitudes, a feature of the Honeywell electronic Fuel Gage, Turbo-supercharger Regulator and Autopilot.

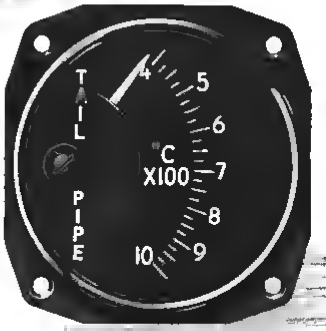
This evidence of how Honeywell Creative Engineering habitually anticipates every requirement for dependable performance is repeated again and again in every Honeywell aeronautical control. It's another reason why Honeywell controls always promote improved efficiency—and are recognized for their reliability. Minneapolis-Honeywell, Minneapolis 8, Minn. In Canada: Toronto 12, Ontario.

CREATIVE ENGINEERING

MINNEAPOLIS Honeywell

CONTROL SYSTEMS

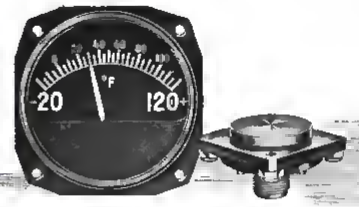
For the wings of tomorrow



WESTON

Tail Pipe Thermometer

—used on the new jet power plants



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Free Air Thermometer

—featuring Weston's flush mounting resistor bulb

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Cross Pointer Indicator (1D-48)

—used with instrument landing systems

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AVIATION WEEK

Vol. 49, No. 8 August 23, 1948

Member of Associated Business Papers, Inc., and the Audit Bureau of Circulations

McGRAW-HILL PUBLISHING CO., Inc., James H. McGraw (1860-1948), Founder. Publishing Office, 99-129 N. Broadway, Albany, N. Y. Editorial and executive offices, 330 W. 42nd St., New York 18. 520 N. Michigan Ave., Chicago 11. 68 Post St., San Francisco 4. Aldwych House, London W.C. 2. National Press Bldg., Washington 4, D. C. Architects Bldg., 17th & Sansome Sts., Philadelphia 3. Hanna Bldg., Cleveland 15. 2656 Penobscot Bldg., Detroit 26. Continental Bldg., St. Louis 8. 1427 Statler Bldg., Boston 16. Rhodes-Haverty Bldg., Atlanta 3. 621 South Hope St., Los Angeles 14. 75-80 Oliver Bldg., Pittsburgh 22. JAMES H. McGRAW 1860-1948, Founder; CURTIS W. McGRAW, Vice President and Treasurer; EUGENE DUFFIELD, Executive Assistant for Publications; NELSON BOND, Director of Advertising; JOSEPH A. GERARDI, Secretary; J. E. BLACKBURN, Jr., Director of Circulation. Aviation Week, 330 W. 42nd St., New York 18. Published weekly; price 50¢ a copy; 50¢ in Canada. Allow at least ten days for change of address. Address all communications about subscriptions to Director of Circulation, 330 W. 42nd St., New York 18, N. Y. Subscription rates—United States and possessions $5 a year; $8 for 2 yr., $10 for 3 yr. Canada $6 for 1 yr., $10 for 2 yr., $15 for 3 yr., payable in Canadian currency at par. Pan American countries, $10 for one yr., $18 for 2 yr., $26 for 3 yr. All other countries, $20 for 1 yr., $36 for 2 yr., $48 for 3 yr. Please indicate position and company connection on all subscription orders. Entered as second class matter July 16, 1947, at Post Office, Albany, N. Y., under Act of March 3, 1879. Volume 49, Number 8. Printed in U.S.A. Cable address: McGraw Hill New York. Member A.B.C. Copyright, 1948, McGraw-Hill Publishing Co. Aviation Week is indexed in Reader's Guide to Periodical Literature and in Industrial Arts Index. Following publications are combined with AVIATION WEEK: AVIATION, AVIATION NEWS, AIR TRANSPORT, AERO NAUTICAL ENGINEERING and AIRCRAFT JOURNAL. All rights in these names are reserved by McGraw-Hill Publishing Co.

NEWS SIDELIGHTS

Airline Probe?

It now appears to be a toss-up as to whether the Ferguson investigating subcommittee will move ahead next with public hearings on airline subsidies, the 1946 Missouri primary election, or export licenses. The group—a subcommittee of the Senate Expenditures in Executive Department Committee, headed by Sen. Homer Ferguson* (R., Mich.)—has been stymied in its conduct of hearings on Communist activities because of the President's refusal to turn over employment records of government personnel.

At a recent executive session, the matter of opening hearings on airline subsidies, the Missouri election, or export licenses was discussed, but no decision reached.

The subcommittee's staff has done comprehensive investigative work on the three subjects. What hearings to be held, and when, will probably be dictated by politics, this election year. Some industry observers think the subcommittee's Republican majority may attempt to link the present financial plight of the airlines to Democratic political influence, resulting in unsound route decisions.

Prototype Tangle

The Inter-Agency Committee which has been formed under the chairmanship of Grant Mason, assistant to Assistant Secretary for Air Cornelius Vanderbilt Whitney, to work out a commercial transport plane development program, is running into difficulties in its relation with the industry. The committee wants to appoint regular industry members to its three working subcommittees on requirements, on technical matters, and on recovery of government expenditures on prototypes.

But the committee's authority to engage $1-a-year men is questionable. Even if the $1 payments were skipped, the committee might be accused if it accepted the regular service of industry personnel.

Also, industry representatives are hesitant to serve as regular subcommittee members. Should the company by which the representative is employed later obtain a prototype contract, he would be subject to public censure, and possibly criminal prosecution under laws rigidly restricting industry-government relationships on procurement.

Air Coordinating Committee's procedure of consulting intermittently with industry representatives has proved satisfactory for the research and policy type projects undertaken by ACC. But it is not a satisfactory arrangement for a committee aiming to blueprint a concrete program for prototype development.

Forrestal on the Hill

Secretary of Defense Forrestal is still tangling with Congress over aircraft procurement.

The supplemental Defense Appropriation Act, providing funds for aircraft procurement, requires the Secretary to submit detailed quarterly reports on the use of funds to the Senate and House Appropriations and Armed Services Committees. Forrestal's "report" for the quarter ending June 30, consisted of two brief paragraphs. The Appropriations Committees branded it unsatisfactory, called for a detailed contract-by-contract breakdown.

Forrestal balked, said the information was "classified", although both Navy and USAF have released details of their procurement program. Finally Forrestal agreed to supply a partial breakdown showing USAF and Navy obligations for aircraft by general categories with the understanding it would be kept confidential.

According to Forrestal's first "report", as of June 30, he had authorized USAF to obligate $1,345,165,000 in cash and contract authorization (out of the $2,295,100,000 provided in the defense supplemental) for procurement of aircraft and parts, and had authorized the Navy to obligate $653,635,000 (out of the $903,000,000 provided in the defense supplemental). Actual obligations, as of June 30, Forrestal said, were USAF, $1,005,125,491; Navy, $458,318,899.

Cash Flow Increases

The government will pump $520,000,000 more cash into the aircraft manufacturing industry this year than last year.

According to the President's mid-year budget report, cash payments (in contrast to contract authorization) for Air Force and Navy aircraft procurement this year will total $1,312,000,000, compared with $792,000,000 in the 1948 fiscal year. This year's USAF payments to aircraft companies will total $880,000,000 (compared with $534,000,000 last year) and Navy payments will total $432,000,000 (compared with $258,000,000 last year).

The record peacetime contract authorization for plane procurement approved by Congress indicates that 1950 fiscal year cash payments to the industry will top this year's by a big margin. USAF was granted $1,687,000,000 contract authorization this year, and the Navy, $588,000,000, or a total of $2,275,000,000.

Department of Transportation?

Brookings Institute is blue-printing a new set-up of government agencies dealing with transportation for the Commission on the Reorganization of the Executive Branch, under contract.

The Commission, headed by former President Herbert Hoover, is scheduled to submit its plan for streamlining the government to Congress in January.

In 1937, Brookings made a study on transportation organization for a Senate Committee, headed by Sen. Harry Byrd (D., Va.). At that time it recommended establishment of a department of transportation, but completely independent quasi-judicial agencies to regulate air, maritime, and land transportation. Charles Doenng, who directed the 1937 study, is also directing the study now underway for the Hoover Commission. It is due to be turned over to the Commission October 15.

Craig vs Craigie

Watch for a "routine" Air Force transfer of Maj. Gen. Lawrence Craigie, staff director of research and development, to Wright Field where he will probably lead the newly established technical institute there. Craigie will be succeeded in his key Washington job by Brig. Gen. Donald Putt, now with the Air Materiel Command at Wright Field and famed as wartime B-29 project officer.

Insiders credit Craigie's "routine transfer" to friction with his Pentagon boss Lieut. Gen. Howard "Pinky" Craig, USAF staff boss of materiel. Craig has spent most of his Air Force career as a tactical planner and is relatively unfamiliar with basic materiel problems while Craigie has a reputation as one of the Air Force's top engineer-administrators.

NEWS DIGEST

DOMESTIC

Air Force has opened its reserve officer ranks to civilian professional and technical specialists regardless of military experience. Grades from second lieutenant to colonel will be available to persons qualified to be production inspection officers, photographic equipment engineers, aircraft inspection officers, airborne signal equipment maintenance and repair officers, ground safety officers, weather officers or design and development officers.

Carlton Putnam resigned as president of Chicago and Southern Air Line but continues as chairman of the board. He is succeeded by Sidney A. Stewart who has been executive vice president.

Bendix Aviation Corp. has bought two adjoining government-owned surplus aircraft parts plants at South Bend, Ind., from the War Assets Administration for $1,050,000. Bendix operated both plants during the war.

Gen. Carl A. Spaatz, retiring commander of the U. S. Air Force, has submitted his report on his stewardship of his command from 1945 to his retirement last June to the Secretary of the Air Force. The document is available to the public from USAF headquarters in Washington.

FINANCIAL

Lockheed Aircraft Corp. reports sales of $33,598,480 for the quarter ended June 30, 1948, as compared with $27,859,221 for the June quarter of 1947. For the first six months of 1948, sales totaled $66,433,832 against $46,932,925 for first-half 1947.

Minneapolis Honeywell Regulator Co. declared dividends on common and 3.20 percent convertible preference stock, series A. Common dividend is 50 cents a share, payable Sept. 10, 1948, to holders of record Aug. 25. Preferred dividend is regular quarterly payment of 80 cents payable Sept. 1 to holders of record Aug. 20.

FOREIGN

China National Aviation Corp. has asked CAB for authorization to serve Tokyo. Carrier now holds a foreign air carrier permit to operate between Shanghai and San Francisco via Honolulu.

Frederick W. Baldwin, one of the first men in the British Empire to fly an airplane, died in Nova Scotia at 66. He was prominently associated with Dr. Alexander Graham Bell's experiments with ailerons and the tricycle undercarriage.

Vol 49, No. 8 AVIATION WEEK August 23, 1948

15 Major Aircraft Companies

Backlog Unfilled Orders, 1948 & 1949

(AVIATION WEEK Survey)

Name	Fiscal Year Ending in 1947	Backlog Fiscal Year End	As of June 30, 1948
Beech	9/30	$22,400,000	$13,100,000
Bell		N.A.	N.A.
Boeing	12/31	230,540,000	295,000,000
Consolidated Vultee	11/30	207,000,000	154,479,235
Curtiss-Wright	12/31	118,500,000	146,500,000
Douglas	11/30	152,044,000	263,000,000
Fairchild	12/31	37,400,000	69,800,000
Grumman		N.A.	N.A.
Lockheed	12/31	139,002,000	182,000,000
Martin	12/31	105,167,000	122,000,000
McDonnell	6/30	36,946,000	90,355,925
North American	9/30	203,000,000	418,685,645
Northrop	7/31	23,905,000	96,000,000
Republic	12/31	57,000,000	81,000,000
Ryan			9,700,000
United	12/31	270,000,000	240,000,000
Totals		$1,606,904,000	$2,181,925,805

N.A.—Not Available

Survey Shows Huge Backlog

15 leading airplane manufacturers report unfilled orders totaling $2,181,925,805.

By Robert Hotz

Backlog of the 15 major aircraft manufacturers increased a half billion dollars during the first half of 1948, according to an industry-wide survey by AVIATION WEEK. An even larger increase is anticipated during the next six months as military orders for fiscal 1949 are translated from letters of intent into formal contracts.

The half billion-dollar backlog increase is entirely in military orders. Backlog of commercial business has shrunk to less than 5 percent of the total with indications that it will virtually disappear early in 1949. Only Boeing, Convair, Beech, Martin and Douglas reported commercial backlogs. Boeing has the largest with $75,000,000 in orders for 55 Stratocruisers scheduled for delivery to airlines during the ensuing 12 months. Convair has a $30,460,000 commercial backlog largely in undelivered Convair-Liners. Douglas reports $18,000,000 for DC-6s, overhaul contracts and spare parts for its various transport models. Beech reports $6,800,000 in firm commercial orders plus $1,800,000 in tentative orders.

▶**Prediction Confirmed**—These data confirm an earlier prediction by the Air Coordinating Committee that the demand for commercial transport would evaporate during 1949. Not much more than 100 airline transports will be delivered during 1948 in contrast to 393 during 1947 and 467 in 1946. Unless some type of government sponsored financing is approved for purchase of airline equipment, transport deliveries will shrink well below 100 for 1949.

Total airframe industry backlog as of June 30, 1948, was $2,181,925,805, in contrast to $1,606,904,000 on Dec 31, 1947. Impact of the two-billion-dollar fiscal 1949 military aircraft procurement program is reflected only partially in the current backlog figures. This is due to a lack of uniformity in company reporting procedures. Some companies include letters of intent in their backlog while others use only final contracts. Most of the fiscal 1949 military orders are now expressed as letters of intent with formal contracts to follow later.

Some companies include work completed but not paid for while others remove orders from backlogs only when payments are received for completed work. The Aircraft Industries Association and the U.S. Bureau of Census are now engaged in a project to introduce uniform reporting procedures throughout the aircraft industry in order to present a more accurate picture of production progress and financial conditions.

▶**Boeing Rise to Top**—Although North American has the largest backlog currently reported, Boeing will emerge at the top before the year's end. North American's reported $418,685,645 includes sizable orders for 451 F-86 jet fighters, 266 T-28 trainers and 51 B-45 multi-jet bombers under the Air Force fiscal 1949 procurement program while Boeing's $295,000,000 does not include its fiscal 1949 orders. Boeing has a USAF letter of intent for 162 B-50 long-range bombers which will add approximately $150,000,000 to the Boeing backlog bringing it up to $445,000,000.

Boeing's reported backlog includes earlier B-50 orders plus commitments for the commercial Stratocruiser, the C-97 military transport. Experimental projects include the BY-50C, an improved Superfortress with Pratt & Whitney VDT engines; the XB-47, six-jet, sweptwing bomber and the XB-52, a long-range bomber powered by four turboprops. Not included in the Boeing backlog is a forthcoming experimental contract for the XB-55, another four-turboprop-powered high speed bomber for the Air Force.

▶**Douglas Third**—Douglas currently ranks third in the industry with a $263,000,000 backlog split between $120,000,000 of signed military contracts, $18,000,000 in commercial business and an additional $125,000,000 in military orders under the fiscal 1949 program for which contracts have not yet

been signed. The latter category includes 365 Navy AD2 attack planes, 28 F3D, Navy twin-jet night fighters, and 38 USAF C-124A, an enlarged and improved transport version of the C-74.

United Aircraft Corp. in fourth place with a reported $240,000,000 does not include its fiscal 1949 prospects. United's backlog is reported as of Mar. 31, 1948. Pratt & Whitney division of United has large commitments for reciprocating and jet engines under the fiscal 1949 program with Chance Vought division slated for 33 F6U and 17 F7U Navy jet fighters, and Sikorsky helicopter division booked for 37 Navy helicopters.

▶**Grumman Unreported** — Grumman Airplane & Engineering Corp. did not report either its current or its previous backlog figures. Republic's total includes $42,000,000 for an additional 409 P-84 Thunderjet fighters under the fiscal 1949 program.

The industry total backlog of $2,181,925,805 represents approximately two years' work or an estimated annual sales volume of slightly more than a billion dollars. This compares with annual industry sales of $363,000,000 for 1946 and $661,914,000 for 1947.

Agreement Signed

Britain and Italy have signed a reciprocal air traffic agreement granting their airlines landing facilities in territories controlled by the two countries.

San Francisco's All-Weather Plan

Landing aids experts outline integrated system for handling high traffic volume regardless of conditions.

San Francisco's Municipal Airport has a plan for all-weather operations that may make it the first major air terminal capable of handling high density traffic volume regardless of weather.

The plan was prepared by Aviation Facilities Associates, Inc., a group of 20 airport and landing aids experts who formerly operated the Navy and CAA experimental station at Arcata, Calif. AFA is headed by Robert L. Champion, former Navy FIDO expert, director of the Arcata station and now professor of airport design at the Brazilian Aeronautical Institute of Technology in Rio de Janeiro. Executive vice president is Dale H. Hutchinson, former Navy meteorologist and chief meteorologist at Arcata. Leon H. Johnson, CCA and ILS specialist at Arcata is also a vice president of Air Facilities Associates.

▶**Annual Appraisal**—The San Francisco survey was conducted for the San Francisco Public Utilities Commission on the recommendation of airport manager B. M. "Mike" Doolin. It was the first job tackled by AFA after its personnel left the Arcata project. The group is now negotiating with Boston, Seattle and Portland, Ore., regarding similar studies. Under its contract with the San Francisco Commission, AFA will make an annual review of the airport's needs and revise its recommendations in light of new technical developments and traffic problems relative to the airport.

The San Francisco airport survey recommends considerable landing aid equipment in addition to the standard combination of ILS, GCA and high intensity approach lights. For immediate operations a carefully sited ILS that eliminates terrain and other beam deflections, a VHF direction finder installed in the control tower and LF compass locator stations on the centerline end of each runway are recommended.

AFA points out that with the increasing use of dual automatic direction finding equipment installations in aircraft, the compass locator stations make it possible to make instrument approaches down to 200 ft. without use of ILS. These installations also provide an excellent check on the accuracy of ILS localizer courses.

▶**Urge Two-Man GCA**—AFA recommends that installation of GCA be delayed until satisfactory two-man sets such as the CPN-4 now being manufactured for the Air Force and CAA are available. Installation of a two-man type is urged to monitor ILS approaches and to aid aircraft not equipped with ILS receivers and instruments such as cockpit indicators.

Also recommended are search and height finding radar for traffic control within a 50 mile radius of the field, and ground radar beacons aligned along the runway center line for use on low approaches by planes equipped with airborne radar. AFA notes that airborne radar is "badly needed on all large civilian aircraft."

In addition to high intensity approach and runway lights, AFA points out the need for high intensity taxi lights particularly in view of San Francisco's ground fog problem. FIDO is recommended in the survey but in view of its cost and the surprisingly small percentage of hours the airport is closed by fog, it may be eliminated in the next AFA annual appraisal. Location of San Francisco Airport on the inland side of the coastal hills is responsible for keeping the field clear when the San Francisco area is subject to heavy fogs from the Pacific.

CARRIER RECRUITS

Eight of the nine U. S. Air Force pilots who are learning the tricks of the carrier trade with the Navy are shown here getting landing signal instructions aboard the USS Wright, a training carrier based at Pensacola, Navy Lieuts. R. W. Grill and A. H. Monohan (extreme right) are explaining use of landing paddles to (left to right), Lieut. G. R. Kenn, Maj. Kenneth O. Chilstrom, Lieut. J. J. Knight, Maj. G. W. Ruddle, Lieut. C. W. Stover, Capt. J. T. Nelson, Maj. L. I. Wierdht, Lieut. J. J. Walsh.

LIFEBOAT suspended from 100-ft. diameter parachute, largest standard chute developed by Air Force, drifts toward surface (left), fins on the bow aiding stability. Boat has been bounded and is under way (right). Normally, fins would be jettisoned. Good rich-made rubberized righting chambers at bow and stern are inflated by carbon dioxide when parachute opens.

Air-Borne Lifeboat Speeds Rescue

All-metal craft can be dropped at sea from B-29 and guided by radio from plane. Accommodates 20 people.

Air-sea rescue services will have at hand within a year a weapon that already promises to revolutionize efforts to assist occupants of planes downed at sea.

It is a 30-ft. long aluminum lifeboat that is dropped by parachute from a B-29. It can carry up to 20 persons, has sufficient supplies for all their needs, including a water purifier, and fuel enough to chug for nearly 1000 miles at low speed. A prototype boat has now been successfully dropped four times and in addition has come unscathed through a tropical storm in the Gulf of Mexico.

Before the initial production order of 151 lifeboats is half completed the boats are expected to incorporate radio control that will increase their effectiveness. The crew of the plane dropping the boat will be able to start the engine by remote control after the boat has hit the water and, if necessary, also guide the boat to land by remote control radio.

▶**Help at 300 Mph.**—The aluminum lifeboats, designated the A-3, are being constructed for the U. S. Air Force by Edo Corp., College Point, N. Y. (AVIATION WEEK, Aug. 16), but will be used to rescue occupants of any plane, military or civil, that lands at sea. While the USAF air-sea rescue service operates under the Military Air Transport Service, USAF, Navy and Coast Guard cooperate closely, with all three going into action when needed.

The A-3 fits any B-29 (and the forthcoming B-50s) with only minor modifications to the plane, and boat-equipped planes will be on call whenever needed. What this means in simplest terms is that once a number of A-3s are in service, help can go to downed airmen at 300 mph. over distances ranging up to 2000 miles.

▶**Public Test**—Aboard an Air Force supply vessel in Long Island Sound an AVIATION WEEK staff member, along with representatives of other publications, watched the first public drop of the all-metal lifeboat. A rubber life raft with four men aboard was set adrift in the Sound.

The B-29 dropped the boat from 1500 ft. at 185 mph. and the parachute put it down about 50 yd. downwind from the raft—precisely where it was supposed to be. The raft, drifting and paddled downwind, quickly overtook the boat which was slowed by the parachute dragging in the water.

Effectiveness of the demonstartion was heightened by the fact that the pilot and crew of the B-29 never before had dropped an A-3.

▶**Durability**—That same boat, however, had been dropped three times before. The A-3 project was started at Wright Field in October, 1946, by the Equipment laboratory, Engineering division, of the Air Materiel Command and Edo began work on the prototype in April 1947. The boat was finished early this year but was not tested until June.

It was then handed over to the test center at Eglin (Fla.) Air Force Base. Within four days the boat was dropped three times, from altitudes of 5000, 800 and 1500 ft. Three speeds were tried, 160, 170 and 183 mph. The test pilots finally recommended the drop conditions to be altitude of 1500 ft. and speed of 185 mph.

During those tests and an overnight cruise (during which a larger escort craft had difficulty riding out the storm and three men in the A-3 spent, they say, a comfortable night), only minor "bugs" turned up. When dropped at 160 and 170 mph., the boat had a tendency to roll over in the air, this has not happened at the higher speed. The gas line needed relocating and the installation of a strainer.

Jobs in Alaska

The Civil Aeronautics Administration has openings for qualified single men as aircraft communicators in Alaska at starting salaries of $3718 a year. Applicants should send federal application form 57, obtainable at post offices and state employment offices to the CAA Aeronautical Center, P.O. Box 1082, Oklahoma City, Okla.

New TWA Board Member

E. O. Cocke, who rose from passenger agent to vice president in charge of traffic for TWA, has been elected to the carrier's board of directors. In July, 1929, as a Los Angeles passenger agent for TWA's predecessor company—Transcontinental Air Transport—Cocke sold the first coast-to-coast eastbound ticket in the history of U. S. air transportation.

Lineup for Cleveland Air Races

Services will make big jet display with assist from Canada. Six civilian races have entry list of 100.

A return match between the rival aerial shows of the Air Force and Navy will feature the 1948 National Air Races at Cleveland Municipal Airport, Sept 4-6

The Air Force Navy feud reached a public climax last month at the Idlewild Air Show in New York. Air Force impresarios are still smarting under caustic comments by top USAF brass over their performance at Idlewild. The USAF relied principally on its Presidential review featuring a thousand plane fly by

▶**Brass Rifled**—In contrast, the Navy's split second timing with a razzle-dazzle of aerobatics, strafing, dive-bombing and fireworks made the USAF effort seem unpolished and a trifle dull. The Air Force has been similarly outperformed at major air shows during the past 18 months (AVIATION WEEK Sept 8, 1947) but apparently top USAF brass had not been aware of the difference until they witnessed the Idlewild show. In contrast to the bitter comments of the Air Force generals, the Navy received a letter of commendation from National Defense Secretary James V. Forrestal for its efforts.

Now the Air Force is attempting to stage a comeback at Cleveland and top the Navy razzle dazzle. Already a full group of 75 Republic F-84 Thunderjets have been earmarked for the air race shows with other features being hatched in the Pentagon.

Most spectacular contribution of the Air Force to the 1947 races will be missing from the current calendar. The Air Force withdrew from the jet division of the Thompson Trophy Race after last year's experience indicated the hazards of closed course jet racing.

▶**Navy Bendix**—Navy will take over the jet division of the Bendix Cross-Country Race this year entering six North American FJ-1 Furies. A trio of Royal Canadian Air Force deHavilland Vampire jet fighters will add an international flavor to the races. They will do aerobatic exhibitions.

Civilian racing field boasts an entry list of about 100 racing planes for six major races. All 1947 winners will defend their titles.

Headlining the racing program will be the Thompson Trophy Race on Labor Day. This 300 mile grind around a triangular course promises again to be a duel between former Navy pilots in war surplus Goodyear F2G Corsairs. Cook Cleland, Cleveland fixed base operator and his chief mechanic Dick Becker, will fly the same Corsairs in which they finished one-two in the 1947 race. Cleland purchased a third F2C to provide spares for putting his two racing entries in top shape.

▶**Pucketts Challenge**—Principal challenge to the Cleland Becker team will come from a partnership of Ron Puckett and Dale Fulton who will also enter an F2G. Puckett provided a stirring performance last year, taking off a lap behind the field and then lapping all but the three leaders before engine trouble forced him out of the race on the 15th lap. Fulton, a TWA international division pilot, won the Sohio race in 1946. TWA mechanics have been putting the Puckett-Fulton plane in shape for the 1948 race. Whether Puckett or Fulton will pilot their plane will not be determined until just before time trials begin at Cleveland. A total of 17 planes are in the Thompson.

The reciprocating division of the Bendix Los Angeles Cleveland dash will feature the first three place winners of 1947—Paul Mantz, Joe De Bona and Ed Lunken. Mantz is entering a three plane team of North American P-51s. De Bona, still backed by movie star Jimmie Stewart and Lunken will fly the same P-51s used last year. Newcomers to the Bendix will be three Canadian built deHavilland Mosquitoes, high speed plywood RAF light bomber. D. M. McVicker of Montreal will fly one, bring the first fringe of foreign competition to the post war races. Plans to bring several outstanding European pilots to the 1948 races were abandoned due to shortages of dollar exchange in England and France.

▶**Women's Race**—Another Mosquito will be flown by Diane Cyrus, of San Francisco, in field of stiff feminine competition. Jane Page, first woman to finish in the 1947 Bendix, will fly Bill Odom's stripped down Republic Thunderbolt (P-47) and Jacqueline Cochran, only woman to win the Bendix, has entered her personal P-51. Sinus trouble may prevent Miss Cochran from flying in the Bendix.

The Goodyear Trophy Race for light planes with engine displace of not more than 190 cu in. drew an entry list of 38 planes from 19 states. Goodyear winner of 1947, Bill Brennand of Oshkosh, Wis., will return in his Steve Wittman special with Steve flying a newly designed midget racer himself.

Another veteran racing pilot returning to active competition in a midget is Art Chester of Los Angeles. Chester designed and built the second place winner last year and will fly an improved version in this year's Goodyear. Chester's second entry crashed recently in California killing its pilot.

The Tony Levier group will again enter three all-metal midget racers. Among other racing pilots who have turned to the midget are Jay Demmg of Palo Alto, Calif., who placed third in the 1947 Thompson, and "Woody" Edmundson, Lynchburg, Va., fixed base operator.

Mac Van Fleet Short

Mac Short Dies At Age of 51

Mac Van Fleet Short, eminent aeronautical engineering authority and a vice president of Lockheed Aircraft Corp., died last week at the age of 51 at the company's Burbank, Calif., plant.

He was a founder of Stearman Aircraft and of the Vega Aircraft Co., which later was absorbed by Lockheed.

Short was born in Wichita. He entered the Army Air Corps in 1917 and after the war studied at Kansas State College spending his summer vacations barnstorming about the country. After being graduated from college, he entered the Air Mail Service and later became an aeronautical engineer at McCook Field.

▶**Time for Research**—In 1940 Short relinquished administrative duties at Vega to devote his time to engineering research and furthering the development of Vega aircraft.

During World War II Short designed training planes and helped in planning the Lockheed Ventura and Neptune. Recently he had been in charge of the firm's military relations.

Short was a member of the Society of Automotive Engineers and was vice president of aircraft activities for SAE in 1940-41. He was a Fellow of the Institute of the Aeronautical Sciences.

Airlift Continues; Not Without Troubles

Allied airlift to Berlin hit its 4500 ton target for a single day last week and then slumped off to only a few hundred tons as heavy rains lashed Berlin and western German airfields.

The 4500 ton daily rate, if maintained, will deliver 275,000 tons to Berlin during a 50-day period contrasted with the 300 000 ton delivery rate of combined barge and rail traffic during a similar period last year. Total of 724 USAF and RAF flights combined to deliver the record total.

▶**Runway Troubles**—As the airlift went well into its second month there were indications that serious airport problems were in the offing as steel mat runways began to crumble under the constant pounding of the heavily loaded planes. Aviation engineers are engaged in a never-ending battle with runway deterioration along the temporary steel mat strips. It is apparent that if the tempo of C-54 operations is to be maintained two asphalt paved runways will be necessary at Templehof.

Strain of augmenting the Berlin airlift was beginning to tell on MATS Domestic service that came to a standstill with the first shipment of MATS C-54s to Europe was resumed last week. C-47s began a thrice weekly roundtrip schedule between Washington and Fairfield-Suisun making stops at Dayton, Oklahoma City, Denver and Ogden, Utah to replace the daily nonstop C-54 runs cancelled by the Berlin needs. And additional two C-47 trips will operate weekly between Washington and Dayton.

▶**Pacific Stripped**—Meanwhile the Pacific division was stripped of 45 additional C-54s to bolster the Berlin operation. This cut the military airline to Tokyo to eight weekly schedules. One of MATS 12 Douglas C-74s arrived in Germany last week and was wrapped in a security blanket despite the fact that the type has been on the unclassified list in the United States for more than a year's time.

Aside from the daily tonnage figures released by Gen. Lucius Clay's command in Germany the entire operation particularly MATS contributions to it is being conducted in an atmosphere of increasing secrecy.

Another B-29 Record By Strategic Air Command

Strategic Air Command is still stretching the range of Boeing's B-29.

A B-29 last week successfully completed a 5792 mile nonstop simulated combat mission. The B-29, flown by Maj. Frank Taylor of the 509th Bomb Group, carried a full combat load including 10,000 lb. of bombs and landed with 317 gallons of gas. The flight was made from MacDill Field, Tampa, Fla., to Los Angeles and San Francisco with the bombs dropped in the Pacific off the California coast. Return flight to MacDill was made at an altitude of 25,000 ft.

This flight set a new Strategic Air Command record for combat loaded B-29s.

Improved cruise control techniques have enabled SAC B-29s to push well over 5000 miles for some time. One B-29 recently completed a 5300 mile nonstop flight from Munich, Germany, to Salinas, Kansas with another flying 5700 miles on a Tampa, Fla. Pacific Coast simulated combat mission. B-29s used on these missions were equipped with torquemeters on each engine affording a precise reading of horsepower output at all times. SAC believes the standard use of torquemeters will afford new possibilities for range increases.

MAULER FLIGHT

Squadron formation of the first Martin Mauler (AM-1) attack group to go into regular service with the Navy. Mauler squadrons are based at Quonset Point, R. I., and will operate with carrier units of the Atlantic Fleet.

ECA and SAS

The European Cooperation Administration recently took over payments amounting to $2,122,500 on four SAS DC-6s—two bought by DDL with an unpaid balance of $1,122,500 and two by DNL, with an unpaid balance of $1,000,000. ECA figures the planes, which will fly trans-Atlantic routes, in competition with U. S. airlines augment the dollar earning power of the two Scandanavian countries.

These four planes are part of an order of 17 placed by SAS in 1946 with the Douglas Aircraft Co.—10 to ABA, 3 to SILA, two to DDL, and two to DNL.

This authorization for ECA funds to pay for completed aircraft is the first of its kind since ECA's inception and confirms AVIATION WEEK's forecast a few weeks ago that following the initial aircraft parts authorization of $965,000 for Air France, more ECA money would be available to foreign nation airlines using U. S. planes and equipment.

INDUSTRY OBSERVER

► Strategic Air Command now has 13 Convair B-36A six-engine bombers and expects to have a full group of 18 in operation before fall. The B-36A will be put through a heavy program of operational testing under simulated combat conditions by the SAC's Eighth Air Force based at Fort Worth. Gen. George Kenny, SAC commander, says the B-36A will fly more than 10,000 miles with a 10,000 lb. bomb load.

► Construction work on Pratt & Whitney's new jet engine development center near East Hartford, Conn., is well under way.

► Boeing's Stratocruiser is now well along on its final 200 hour flight test of accessories and components, last step in CAA certification. The Wichita-based Stratocruiser has been making nonstop flights between Wichita and Florida and Seattle.

► Some technical experts are dubious over the technical feasibility of establishing a 27-mile microwave relay between the Air Force's long range search radar at Sandy Hook, N. J. and the CAA air traffic control center at LaGuardia Field. The proposed hookup would be used for air traffic control in the congested New York area.

► Gilfillan Bros. of Los Angeles, makers of search radar and GCA, is moving its flight test division to Ontario Airport near Los Angeles. A 32-month lease has been signed to cover an extensive flight test program for new types of GCA, taxi-radar and air traffic control equipment.

► British European Airways has begun a research project to study high altitude gusts encountered in clear air. These gusts, encountered from 20,000 to 40,000 ft., are expected to be problem in structural design and passenger comfort in high speed, jet transports now under construction in England.

► Royal Canadian Air Force transport command has begun trans-Atlantic training flights in Canadair DC-4M transports between Montreal and England.

► British Overseas Airways Corp., will use British made auxiliary equipment and furnishings in its 22 Canadair DC-4M2 airliners to be used on its trans-Atlantic routes. This will reduce U. S. manufacturers' sales of parts to Canadair.

► Douglas is developing a new type of gust lock that will restrict throttles to low manifold pressures when the gust lock is on but permits the engines to be run up and checked two at a time. Release of the gust lock moves the throttle stop forward and permits application of full power. If tests indicate the new device is satisfactory, service kits will be made available to DC-4 and DC-6 operators.

► Air Force has removed its resident representative from the Bell Aircraft Corp. plant in Buffalo. Bell contacts with the Air Force will be handled through the USAF eastern procurement district headquarters in New York.

► Cornell Aeronautical Laboratory has been designated by aircraft manufacturers to conduct evaluation tests on non-inflammable hydraulic fluids for civil aircraft. The Cornell Laboratory's job will be to determine characteristics of the fluids submitted for test and evaluate their ability to meet airline operating requirements.

AVIATION CALENDAR

Aug. 24—ICAO African-Indian Ocean regional air navigation meeting, Seattle.
Aug. 24-27—American Institute of Electrical Engineers Pacific General Meeting, Davenport Hotel, Spokane, Wash.
Aug. 25-26—AIA Engine and Propeller Technical Committees Meeting on AN-D-13 drawings and data lists, Hotel Statler, Washington.
Aug. 26-27—International Wakefield Trophy Model Airplane meet, Akron, Ohio.
Aug. 27-29—Annual convention, Ninety-Nines, Hotel Muehlbach, Kansas City, Mo.
Sept. 2-4—National Flying Farmers Association convention, Ohio State University, Columbus, Ohio.
Sept. 4-6—National Air Races, Cleveland.
Sept. 5-11—Seventh International Congress of Applied Mechanics, Imperial College of Science and Technology, South Kensington, London, England.
Sept. 6—ICAO Air Navigation Committee, Montreal.
Sept. 7—ICAO Council fifth session, Montreal.
Sept. 7—ICAO Air Transport Committee, Montreal.
Sept. 7-12—SBAC aircraft show and display, Farnborough, England.
Sept. 9—IATA legal committee, Brussels.
Sept. 11-12—Second Annual AOPA Summer Round-Up Flight, Rehoboth Beach, Del.
Sept. 12—Oakland Aviation Day, Municipal Airport, Oakland, Calif.
Sept. 12—IATA executive committee, Brussels.
Sept. 12-17—National Instrument Conference, Instrument Society of America Convention Hall, Philadelphia.
Sept. 14-16—AIA Airworthiness Requirements Technical Committee, Joint Division Meeting, Chicago.
Sept. 14-18—IATA fourth annual general meeting, Brussels.
Sept. 17-19—First annual convention, Fourteenth Air Force Association, Biltmore Hotel, Dayton, Ohio.
Sept. 19-21—Twelfth International Convention, Northwest Aviation Planning Council, Vancouver, B. C.
Sept. 26—IATA executive committee, Brussels.
Sept. 24-26—Air Force Association National Convention, Hotel Commodore, New York.
Oct. 20-21—National Safety Council Air Transport Section, Hotel Stevens, Chicago.
Oct. 6-8—National Association of State Aviation Officials, Copley Plaza, Boston.
Oct. 9-9—Society of Automotive Engineers aeronautic meeting, Biltmore Hotel, Los Angeles.
Oct. 14—Annual Air Line Dispatchers Association convention, Edgewater Beach Hotel, Chicago, Ill.
Oct. 15-24—International aircraft exhibit, Royal Danish Aeronautical Society, Copenhagen.
Oct. 17-21—National Aviation Clinic, Detroit.
Oct. 21-22—Society of Automotive Engineers production meeting, Statler Hotel, Cleveland.
Oct. 22-23—4th Annual Arizona Aviation Conference, sponsored by Chamber of Commerce, Prescott.
Nov. 4-5—Society of Automotive Engineers, fuels and lubricants meeting, Mayo Hotel, Tulsa, Okla.
Nov. 9—ICAO operations division, Montreal.
Nov. 15-17—Aviation Distributors and Manufacturers Assn. sixth annual meeting, Hotel Statler, Cleveland.
Nov. 15-17—National Aviation Trades Assn. annual meeting, Allerton Hotel, Cleveland.
Nov. 16—ICAO airworthiness division, Montreal.
Nov. 15-18—National Association of Travel Officials, Miami Beach.
Nov. 23—ICAO southeast Asia regional air navigation meeting, New Delhi.
Dec. 2-5—Fourth annual international aviation celebration, El Paso.

ENGINEERING & PRODUCTION

Boeing Strikers Still Out

Company and union have set their terms for reinstatement, but they still have differences of opinion.

Another hope for settlement of the strike against Boeing Airplane Co. was flickering out early last week.

For a while it looked like the company and the Aeronautical Mechanics Union were closer together than at any time since the union walked out Apr. 22. Responding to the recommendation of a National Labor Relations Board examiner (AVIATION WEEK, Aug. 2), the union notified the company it was getting individual requests for reinstatement at Boeing and would terminate the strike as soon as the company said it would comply with the reinstatement application.

The company replied it was willing to reinstate the strikers if the union would end the strike "unconditionally" and if certain conditions were met. The conditions: retention of workers hired during the strike, recognition that the old contract no longer is effective, pay scale of 15 cents an hour over pay at time strike began, acceptance by Aug. 14.

► **Turndown**—At first the union asked a conference to iron out differences in conditions unacceptable (the pay raise apparently was not objectionable although it is the same as Boeing offered before the strike). Then came the union's official reply: The company offer was "neither good nor fair."

According to the union the company asked the workers to return "without a contract, without our rightful jobs and without a genuine union." In addition, the company proposal did not give the union sufficient time to consider. "We are a democratic union and need enough time for the entire organization to consider any offer," the union said.

► **Greater Payroll** — There the matter rested at midweek. But puzzling observers, were Boeing's future employment plans. All along the company said that by subcontracting it would cut down the size of its payroll—from about 18,000 to 14,000. But if it takes back the strikers and keeps employes hired since April, it would wind up with far over its pre-strike employment.

The company recognizes this and states: "After careful review of the situation and in the interest of bringing the strike to an end, we have concluded that we should endeavor to make arrangements to utilize such larger work force until such time as normal attrition reduces the force to a proper level."

FIRST PRODUCTION BANSHEE

McDonnell Aircraft Corp.'s first F2H-1 (Banshee) rolls off the assembly line at the manufacturer's Lambert Field, St. Louis, plant. Looking over the craft are Don R. Berlin, vice president, engineering and contracts; Robert M. Edholm, test pilot and Captain Felix Baker, Navy representative at McDonnell. Craft is the first of a production order of 235 for the Navy. To help meet this and other production orders, McDonnell expects total employment to reach 7000 by the fall of 1949.

Profits Again

Influence of bigger military business and workings of the income tax laws are being reflected in manufacturers' financial reports. Latest cases in point are the profits shown by Douglas Aircraft Co. and North American Aviation, Inc.

For the first six months of fiscal 1948 (ending June 1), Douglas netted $424,951 on sales of $42,796,767 as against a loss in 1947 of $752,307 on sales of $54,534,370. NAA, reporting for nine months ending June 30, had a net of $1,258,185 on sales of $39,607,065.

Showing up in the Douglas report is what probably will be a common feature of this year's statements: great cut in operating costs over 1947. Reason is that few manufacturers have any carry-back tax credits left, but can carry forward previous losses against this year's profits.

Babb Sells 200 Traioers To Chinese Air Force

The Babb Co. has delivered the first 18 of 200 Harvard trainers sold to the Chinese Air Force and expects to complete the shipment in 90 days.

The order also covers 125 spare engines and a large quantity of spare parts. The planes are being reconditioned on the West Coast and shipped by boat to China. The engines will be sent direct after overhaul by Pratt & Whitney repair depot at Millville, N. J.

The sale disposes of virtually the last of about 500 of the AT-6-type trainers purchased by the Babb Co. from Canada after the war. Previously 75 were sold to the Swedish, 75 to the Dutch and 40 to the Swiss Air Forces.

Cadillac Uses Airfreight

Cadillac Motor Car division of General Motors Corp. is now using airfreight for shipment of about twelve tons of replacement parts monthly.

Four-Place Plane for $2995?

New California company pinning hopes for record low price on acquisition or control of engine plant.

Aviation industry received with skepticism last week west coast announcement of a new all-metal mass production four-place airplane complete with retractable landing gear planned to be marketed at the sensationally low price of $2,995 flyaway factory.

Prototype of the new personal plane market entry, the Atlas H-10, designed by the well known engineer Max B. Harlow, was flown in two demonstrations at Santa Monica's Clover Field last week. The plane is scheduled to be produced by the Atlas Aircraft Co., new concern of which Harlow is president and which plans to open a plant at Hemet, Calif.

▶**Too Cheap?**—Skeptical reaction to the H-10 pricetag found in industry was based on the fact that the price quoted is approximately $1000 lower than that of the cheapest four-placer now being marketed. Any all-metal airplane of comparable performance costs three times as much or more.

It is reported that Atlas is seeking to buy an existing aircraft engine plant to supply powerplants for the new airplane.

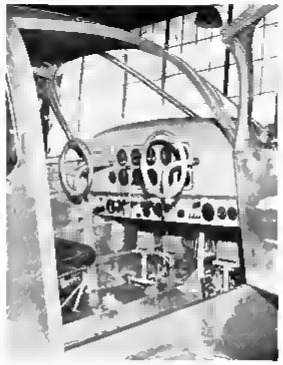
▶**Engine Sources**—Aircooled Motors, Syracuse, now owned by Tucker Corp., and Jacobs Engine Co., Pottstown, Pa., have been mentioned as possible engine sources. Company announcement said production version of the airplane would be powered by a 220 hp "Atlas" engine, manufactured by an east coast company for Atlas and carrying an Atlas warranty.

Cited by Atlas as evidence of the plane's engineering for low-cost and large volume production:

- **Fuselage** can be bench-made in four sections and then "sewn up."
- **Wing** is one-piece with no expensive fittings.
- **Fuselage** is assembled to wing by placing on top of wing and fastening with extrusion on each side, eliminating costly fittings and manhours.
- **Horizontal stabilizer** in one piece is notched into fuselage and fastened with extrusions.
- **Worm** and gear mechanism operates landing gear and is self-locking in "down" and "up" positions.

The model H-10 is described as the tenth in a series of designs by Harlow, all aimed at producing a high performance plane for the private flyer at lowest cost, and is said to combine best features evolved from previous models.

▶**Plane Specifications**—The company specifications and performance data reported for the H-10 plane include normal range, 802 miles, 150 mph. cruising speed, 170 mph. top speed, 55 mph. stalling speed, 1200 ft./min. climb, 15,500 ft. service ceiling, weight empty 2082 lb., gross weight 3200 lb., baggage allowance 80 lb., wingspan 35 ft. 9 in., wing area (including ailerons) 185 sq. ft., length 28 ft. 4 in., height 8 ft. 2 in., fuel capacity 56 gal., propeller diameter 96 in., mechanically retractable main wheels and fixed tail wheels, wheel tread, 90 in.



Increase Seen Due In Minimum Wage

The "prevailing minimum wage" which, under the 1936 Walsh Healey Act, employers in the aircraft industry must pay on government contracts of $10,000 or more is due to be raised. It has been 50 cents an hour since May 7, 1942.

Action for raising the minimum was instituted by the CIO Automobile, Aircraft and Agricultural Implement Workers by filing a petition with Wage-Hour Administrator William R. McComb.

Preliminary discussions already have been held between representatives of the industry, the unions and the administrator on the definition of the aircraft industry. Agreement on a definition is likely at another meeting set for Sept. 21, at which time will also be decided the method of collecting wage information to be used later at a public hearing on raising the minimum.

▶**AIA Survey**—The Aircraft Industries Association, at the request of the administrator, is surveying the industry for information to be used in determining the limits of the aircraft industry. This will disclose whether any changes in custom since 1942 will require a new definition.

If the preponderance of an aircraft item, by volume, is produced by the industry, then that item falls within the industry and any manufacturer making it comes under the aircraft minimum wage. If an aircraft part is purchased largely from outside the industry, then it and the producer would be excluded.

A higher minimum probably will reflect the three rounds of postwar wage increases.

▶**Negotiators**—Industry representatives who participated in preliminary discussions with the Wage-Hour Administrator include:

Theodore Hartwell, Aircraft Industries Association; Earl D. Osborn, president, Edo Corp.; George A. Lewis, Consolidated Vultee; R. M. Winkler, Engineering Research Corp.; Samuel A. Angotti, Fairchild Engine & Airplane Corp.; J. F. Howard, Sperry Gyroscope; Morgan Mooney, United Aircraft Corp., and C. W. Cole, Curtiss Wright.

Measures Fuel

New electronic fuel gage system developed by Minneapolis-Honeywell Regulator Co., 2753 4th Ave., S., Minneapolis 8, Minn., is stated to offer weight saving of approximately 30 percent over company's present gage. In addition, it provides low-level fuel warning, and employs smaller fuel indicators. Production is scheduled for early '49.

BRIEFING PRODUCTION NEWS

▶**Chance Vought Aircraft division,** United Aircraft Corp., will spend $1,000,000 for renovation and expansion of its new facilities near Dallas, Tex. Work will include installation of special air-conditioning equipment needed to maintain close temperature limits for the fabrication of Metallic materials. A new building is under construction to house an engineering department (wartime North American operation consisted of production only). The new building will have 129,000 sq. ft. of floor space and accommodate 800-1000 engineers. Production is slated to get under way the end of the year.

▶**Kollsman Instrument division,** Square D Co., has developed a Transducer unit which produces an accurate electrical signal as a function of air speed, altitude, differential pressure and gage pressure. This signal can be carried to a telemetering transmitter for relaying to the ground. The unit is 1½ in. x 1½ in. by 2 in., making it ideal for installation in special research aircraft and guided missiles. The varying resistor type, operating on d.c. current, weighs six ounces, the induction type, operating on a.c., weighs eight ounces. The electrical signal can be employed in conventional synchro circuits, variable voltage output and phase shifter circuits.

▶**Sperry Gyroscope Co.** has received an order for 20 engine analyzers from Pan American World Airways for installation in Boeing Stratocruisers. The units will cost $70,000. A complete report on the airplane powerplants can be available to ground crews upon landing with the latter proceeding directly to the trouble without the time-taking ground trouble shooting method. The analyzer was developed by John E. Lindberg, Jr., PAA engineer, and is being built by Sperry under an exclusive license.

▶**Consolidated Vultee Aircraft Corp.** has received a CAA Approved Type Certificate for the Convair-Liner, authorizing the airplane to be operated in scheduled service at a gross weight of 40,500 lb., an increase of 1000 lb. over its previous certification. This weight may be used for takeoff with a 24-degree flap setting and a maximum landing weight of 38,600 lb. with a 30-degree flap setting on approach and a full 39-degree setting for landing.

▶**Spartan Aircraft Co.,** Tulsa, Okla., is increasing its output of converted warplanes for executive transports, the latest project being a Lockheed PV patrol plane converted to passenger service for Dresser Industries, Cleveland. Conversion included additional skin plating, cutting of windows, upholstery, additional radio equipment and an added 500-gal. fuel capacity in the bomb bay. Other conversions include a Douglas A-26 for Aponaug Co., and an A-26 for Standard Oil of Indiana.

▶**Northrop Aircraft, Inc.,** is seeking 400 new aerodynamicists, stress engineers and advanced designers to bring its engineering staff up to the 1500 required for urgent Air Force research and development projects. Current backlog includes about $100,000,000 worth of orders for 30 Flying Wing B-49 jet bombers, 23 C-125 Raider assault transports, XF-89 all-weather fighter and X-4 research airplane. Northrop also is engaged in guided missile and nuclear energy research.

▶**Republic Aviation Corp.** reports a backlog of approximately $81,000,000, including new Air Force contracts totaling $42,000,000 for 409 additional F-84 Thunderjet fighters. Approximately 300 Thunderjet fighters of an initial order for about 600 have been delivered. This leaves more than 700 to be delivered over the next two years, to bring USAF's Thunderjets to more than 1000.

▶**Clifford Manufacturing division,** Standard-Thomas Corp., Waltham, Mass., has developed a radically new type heat exchanger for use in jet planes. The new unit is an outgrowth of Standard Thomas' oil cooler and expansion tubing business and its extensive experience in the transfer of liquids and gases under wide variations of heat and pressure.

▶**Aerojet Engineering Corp.,** a division of General Tire and Rubber Co., has acquired its 68-acre plant facility at Azusa, Calif., from the War Assets Administration. The site had been under lease since its construction in 1943. Aerojet now employs more than 700 and has a capacity of 20,000 JATO rocket motors per month.

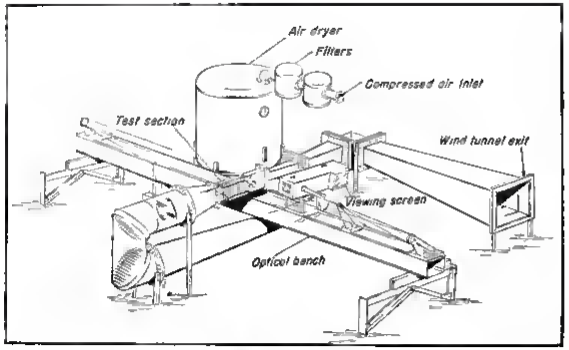


Fig. 1. Layout of North American Aviation's small supersonic wind tunnel

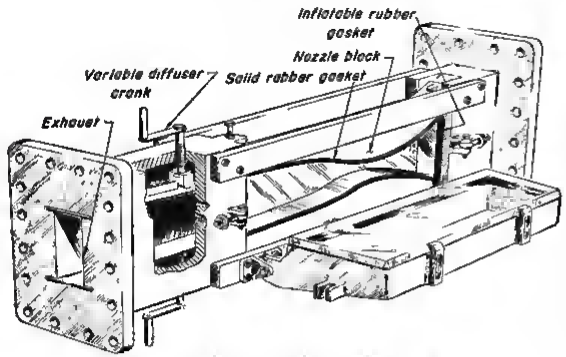


Fig. 2. Perspective of NAA wind tunnel's test section

Supersonic Tunnel for Missiles

North American installation uses factory compressor air supply. Design facilitates testing procedures.

By R. B. Pearce*

Early in its guided missile research program, North American Aviation, Inc. decided to build supersonic wind tunnel facilities at company expense.

The first wind tunnel was to be built as cheaply and quickly as possible so that studies could be made before the larger development tunnel was built.

To reduce the initial cost of an air supply, use was made of the compressors already employed in the factory for operating pneumatic tools.

These compressor facilities had been expanded during the war when production was at a peak. At the time the wind tunnel was designed the compressors were operating at a maximum load of only 30 per cent capacity.

A test measurement was made of the amount of air which could be drawn by the tunnel without exceeding maximum capacity of the compressors when the factory was engaged in normal manufacturing operations. This determined the first design condition—the size of the test section.

Close liaison was maintained with the Guggenheim Aeronautical Laboratory, California Institute of Technology, throughout the tunnel design period. Hence many of the details of the two tunnels are similar.[1]

▶**Operational Details** — A schematic sketch of the wind tunnel layout is given in Fig. 1. Compressed air is brought through a six-inch air line first to a water separator, then an oil filter and finally the air dryer—a huge tank containing silica gel, designed to dry the air from 70 F. saturated to −40 F. dew point.

It has been found in other supersonic tunnels throughout the United States that −40 F. dew point permits the air to become supersaturated in the test section at high Mach numbers. This dew point is, however, low enough to prevent any measurable condensation of moisture in the supersonic stream.[2]

After the air is dried it is throttled from 95 psig. to the proper supply pressure corresponding to the test section Mach number.

It is expected that Mach 3.6 can be reached when the air is used at its maximum pressure. At present only M = 1.85, M = 2.45, and M = 2.80 nozzles have been used.

After leaving the throttling valve the air enters the settling chamber by way of two 90-deg. turns with turning vanes and passes through four fine mesh screens. These screens and the very large contraction ratio of the nozzles assure a low turbulence level in the test section.

When the tunnel was operated at the same time the factory was engaged in airplane production, test supply pressure would vary as much as five per cent. To correct this, a bypass was added containing a Fischer valve with a servo-automatic control to hold the supply pressure constant to one tenth inch of mercury.

▶**Test Section**—The nozzle and test section are machined out of one piece. The windows start in the subsonic part of the nozzle and continue to the end of the test section. This arrangement eliminates the need for a joint at the beginning of the test section, present in most supersonic tunnels.

Nozzle and test section blocks were designed for rapid replacement so that the Mach number of the test could be changed with a minimum loss of time. The sidewalls are hinged and can be opened or closed quickly.

Fig. 2 shows arrangement of the test section and a schematic view of the variable diffuser. The section was made rectangular (1¾ by 4½ in.) for two dimensional testing.

When more air capacity is obtainable or when night operation becomes feasible, the test section width can be doubled, affording a medium-sized tunnel for the testing of missile models.

Both solid and inflated rubber gaskets were used. Solid rubber .270 by .270-in. gaskets in a ¼ by .240-in. rectangular groove gave excellent results. The windows could be tightened and effectively sealed to .005-in. clearance of the nozzle blocks with no danger of breaking.

The inflatable gaskets at the ends of the windows and nozzle blocks have operated successfully only a few times. They are not used at all for present tests since leakage out of the subsonic contraction cone or into the variable diffuser intake is apparently of no consequence except for the added noise.

A future design will incorporate only solid gaskets, with sealing force applied by the tightening of the windows against the gaskets.

▶**Diffuser Described**—The diffuser, also illustrated in Fig. 2, was designed with adjustable top and bottom walls to discover if greater pressure recoveries could be obtained with diffusers whose cross-sectional area could be decreased after the tunnel had started.

In this design the tunnel would start at the setting for best pressure recovery and eliminate the need for diffusers with greater than critical area ratio.

However, this variable geometry diffuser has one distinct advantage: the best shape for each Mach number can be obtained quickly. For intermittent-operation wind tunnels this is an important feature since it adds 10 percent to available test time.

▶**Decibels Curbed**—A problem, not anticipated, was noise of operation. Close to the tunnel exhaust duct the sound level was 130 db. A muffler was installed in the last diverging section of the diffuser just aft of the 90-deg. turn, and the exhaust duct was lined with sound absorbing materials. Forward part of the diffuser was insulated externally with asbestos. The sound level was thus reduced to the general noise level in the area.

▶**Schlieren System**—The optical system is the conventional offset schlieren device. An intense light source (G E BH 6 lamp) is focused through a collimator upon a prism located at the focal point of an 8-in.-dia., 60-in. focal length paraboloidal mirror.

This reflects a parallel beam of light through the test section to the opposite side of the tunnel where an identical mirror refocuses the beam on a screen.

At the focal point of this second mirror a sharp straight edge cuts off a portion of the light. When the rays passing from the first mirror to the second are undeflected the effect of inserting the knife edge at the second mirror's focal point is to dim the screen uniformly.

But when some rays are deflected by air density gradients in the tunnel or density gradients in the glass walls, corresponding light and dark areas appear on the screen. This effect is most striking (with uniform glass) when caused by shock waves in which the density gradients are very large, and thus their images are distinct.

Fig. 3 is a typical schlieren photograph showing the density gradients, black is density increasing upward, white is density increasing downward.

▶**Balance System**—This was designed to support the models from one side of the tunnel. Importance of measuring center of pressure accurately on missile models dictated that the center of rotation of the balance be close to the center of pressure of the model.

The balance measures the drag force and two lift forces, one forward and one aft of the C.P. Thus lift, drag and center of pressure can be measured.

Fig. 4 shows the thin plate and half model installed in the test section. The plate is used to separate wind tunnel boundary layer flow under the model from the free-stream flow.

A half-model configuration was selected so that it could be placed close to one wall and thereby lengthened. The criterion determining model length for proper simulation of uniform supersonic flow is that the nose shock reflection from the tunnel wall must not strike the model.

▶**Pressure Recovery**—Pressure ratio required to operate a supersonic tunnel is given in Fig. 5. Air supply is at 105 psig. and when the tunnel is in operation line and filter losses reduce this to 95 psig.

This high pressure is necessary only for operation at the highest Mach number, M = 3.6. For lower Mach values the air is throttled so that the supply-to-exit pressure ratio corresponds to the value given in Fig. 5. Air volume requirements are given in Fig. 6 for the 1¾ by 4½ in. test section.

The crosses in Fig. 5 are test points obtained using the variable geometry diffuser in its optimum positions. The circles represent pressure ratios obtained with boundary layer control in the diffuser using a high-speed jet of air.

▶**Boundary Layer Control**—Preliminary experiments with air injected into the diffuser gave noticeable improvements in the pressure recovery. It is thought that this is due to the action of the jet preventing separation in the subsonic part of the diffuser, since the jet enters at the diffuser throat and the tunnel operates with a steady hum. In the past there has been an intermittent rumble in the diffuser and exhaust duct suggesting separation in the subsonic part of the diffuser.

Improvement in pressure recovery is reflected in the lower pressure ratio required to operate the tunnel (Fig. 5).

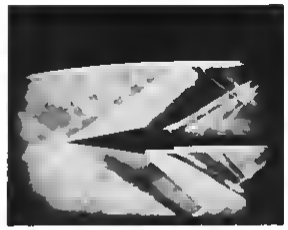


Fig. 3. Schlieren photograph of a 20-deg. cone at value of M = 1.85.

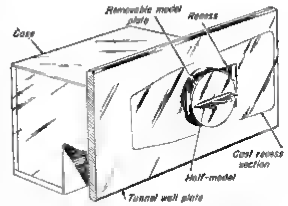


Fig. 4. A4b model on balance system.

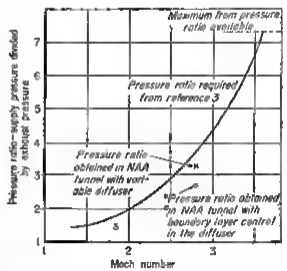


Fig. 5. Graph of pressure ratio required for operating a supersonic wind tunnel.

Tests have not yet been made to determine the best shape, size, or location of the jet or even the amount of air used in these present tests. However, a development program is planned to determine these factors.

▶**Nozzle Calibration**—There are a number of methods available for calibrating the nozzles. Simplest method is that of measuring the local static pressure and supply or total pressure. This ratio is given as

$$P_s/P_t = \left(1 + \frac{\gamma - 1}{2} M^2\right)^{\frac{\gamma}{1-\gamma}}$$

for isentropic flow. Disadvantages are that local static pressures are difficult to measure accurately because of unknown local flow direction and that the magnitude of the pressure is so small

*Supervisor of experimental aerodynamics, Aerophysics Laboratory, North American Aviation, Inc.

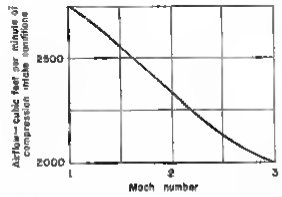


Fig. 6 Airflow requirements for tunnel

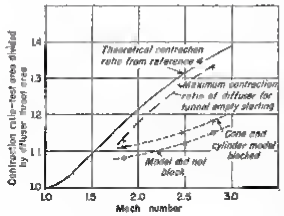


Fig. 7. Blocking and choking in tunnel.

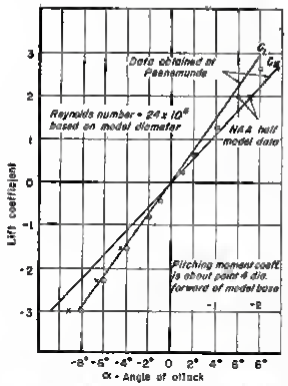


Fig. 8. Wind tunnel lift and pitching moment data on A4b missile at value of M = 2.45

that its precise determination is difficult

An easier and more accurate method is the measurement of the local pitot pressure and supply pressure. This ratio is given as:

$$\frac{p_t'}{p_t} = \left[\frac{2\gamma}{\gamma+1}M^2 - \frac{\gamma-1}{\gamma+1}\right]^{\frac{1}{1-\gamma}} \times \left[\frac{(\gamma-1)M^2+2}{(\gamma+1)M^2}\right]^{\frac{\gamma}{1-\gamma}}$$

for isentropic flow to the point just forward of the shock wave ahead of the pitot tube.

A less accurate method is the measurement of shock wave angles on a schlieren photo of a 20-deg. cone. Accuracy of this method probably improves at low Mach values where the shock wave angle changes rapidly with Mach number.

▶**Tunnel Choking** — Tests were run with the variable geometry diffuser to determine if greater pressure recoveries could be obtained at contraction ratios (ratio of diffuser entrance area to throat area) greater than the critical contraction area ratio.

Although ratios greater than critical could be obtained after the tunnel had started, the pressure recovery was not improved. Tests were then made with fixed geometry diffuser to see at what contraction ratios the tunnel would start without choking.

A third series was run with cylindrical pointed models of various diameters to determine the maximum model size at which the tunnel would operate without blocking. These results are plotted in Fig. 7 with the theoretical critical contraction ratios from Reference 4.

▶**Half-Model Tests**—First model tested was that of the German A4b, the V-2 with wings. The purpose was to compare results from the NAA tunnel with those from the 40 × 40 cm supersonic tunnel at Peenemunde.

The German test results can be found in Reference 5 and the data used in the comparison are plotted in Fig. 8. Crosses and circles in the figure are pitching moment coefficient and lift coefficient, respectively. Agreement is closer than would be expected for so small a model (.006-scale).

The Reynolds number of the NAA test was approximately 24 × 10⁶ and that of the German tests was approximately 5 × 10⁶ even though the German model was approximately four times larger. This is because the test section pressure in the NAA tests was approximately twice that in the German tunnel while all other conditions were the same.

Drag data did not agree so well, largely because drag forces on the model in this test are only 10 percent of the tare forces which are measured on the plate and supporting arm.

Since center of pressure can be located within 1/10 diameter from the lift and moment data, this system will continue to be used for stability investigations.

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4. Kantrowitz, Arthur, and Donaldson, Coleman D., "Preliminary Investigation of Supersonic Diffusers," Wartime Report originally issued as NACA ACRL5020, May, 1945.

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Giant Test Center Seen at Palmdale

A 5000 acre experimental supersonic aircraft testing center equipped with electronic controls capable of bringing test planes in automatically from an approach range of up to 100 miles is envisioned for Los Angeles County's Palmdale Airport on the Mojave Desert.

Col. William J. Fox, director of county airports, says that present plans call for making the airport the nation's No. 1 testing center for very high speed aircraft, with assembly and testing facilities to be leased to aircraft manufacturers.

Condemnation proceedings have been started to expand the airport to an area of 5000 acres.

Installation of 12,000-ft. concrete runways is planned for 1949.

▶**Former Jet Base**—While Colonel Fox would not disclose identities of manufacturers interested in the project, AVIATION WEEK has learned that Lockheed at one time contemplated erection of a jet plane assembly and testing plant at Palmdale. Previous lease entanglements which precluded expansion of the airport at the time prevented activation of Lockheed's program.

During the war Palmdale was used as an experimental base for the nation's first jet training squadron, flying Bell P-59s.

▶**Still Open to Airlines**—Palmdale has long served as chief alternate airport for airlines terminating at Los Angeles, and Colonel Fox says that a proviso of any jet testing leases will be the continuation of the airport's use as a commercial alternate when transports are unable to enter the Los Angeles area. However, the use of the airport by personal aircraft will be prohibited.

The jet test center proposal is particularly attractive to aircraft manufacturers in that Palmdale Airport is only a short distance from the Air Force's high-speed proving ground, Muroc Air Base, and offers close correlation of factory testing with that conducted at Muroc by Air Materiel Command.

Trailing from Gulf Oil Corp.'s flying lab is magnetometer housed in nose of "bird" that is lowered via special hoist in the craft

Flying Magnetometer Speeds Oil Search

Prospecting instrument, trailed from plane, supplies data narrowing investigation to promising regions.

By Irving Stone

Another impressive example of the time-saving adaptability of aircraft was recently disclosed with a demonstration of the airborne magnetometer—a reconnaissance tool used by the Gulf Oil Corp. in its preliminary geophysical surveys to determine the location of petroleum deposits.

With this tool—considered the fastest known means for securing prospecting data—a survey crew can now map 450 mi. of profile daily, as against approximately 50 mi. covered with a surface magnetometer in fairly open country.

In addition, the airborne device permits surveys over jungle, mountain, ocean or other areas normally inaccessible or economically prohibitive to explore.

Cost of this survey method is claimed to compare favorably with other procedures now in use.

Already, Gulf has completed with the airborne magnetometer surveys of thousands of square miles in rugged Eastern and Western Canada, parts of New Mexico, West Texas and South American jungle, and an 85,000 sq. mi. ocean area in and around the Bahamas.

▶**Magnetometer Trailed**—Operation of the magnetometer was witnessed by this AVIATION WEEK correspondent, first from a companion plane to observe lowering and retraction of the bomb-like magnetometer housing—the "bird"—carried by the Gulf survey craft, and finally in the Gulf craft itself (converted C-47), which also contains navigational, camera recording, and geophysical charting equipment.

The airborne magnetometer—an outgrowth of the dip needle—is housed in the nose of the bird and is trailed from the plane on a 65-ft. cable.

As the plane flies along a predetermined course, the varying intensities of the earth's magnetic field are measured and recorded electronically.

▶**Data Mapped**—These magnetic intensities are then translated by geophysicists into magnetic contour maps to provide data on the structure of the igneous or basement rock thousands of feet below the earth's surface.

On the basis of this information, the possibility of oil accumulations in the sedimentary, or oil-bearing rocks, overlying the basement rock may be inferred.

▶**Search Narrowed**—Although not directly indicating the presence of oil deposits, the airborne magnetometer functions to minimize guess in exploration by narrowing the search to areas where the possibilities of oil accumulation are favorable.

From information obtained with the instrument geophysicists and geologists are able to eliminate from further exploration large unpromising areas and to concentrate additional exploratory efforts on regions which are promising.

▶**Device's Sensitivity**—The magnetometer itself is a relatively small unit. Its vital component is a magnetically sensitive element, about the size of a cigarette. This reacts to the earth's magnetic field, which is roughly 50,000 gammas in terms of the geophysicist's unit of magnetic intensity.

Sensitivity of the element allows it to measure changes of 1 gamma in the magnetic field, or 1/50,000th of the total field intensity.

▶**How Survey is Made**—Flight crew of the survey craft consist of two pilots and three instrument operators. Each morning of the survey they confer at the base airport with a Shoran (short range navigation) flight director for briefing on the day's operations. The particular routes they are to fly are shown on a map. Areas they cover are usually "spaced" into lines about 1 mi. apart and about 75 mi. long.

The flight director heads two Shoran mobile navigation ground stations located at high points near the area to be flown. In flight the craft transmits a high frequency radio pulse, which is picked up by each of the ground stations.

These stations, in turn, retransmit the pulse back to the plane. Time elapsing between transmission and reception of the pulse is a measure of the distance between the aircraft and ground stations. Since the plane's altitude is known, its position is accurately determined by triangulation.

Every 20 to 30 sec., a 35 mm. camera photographs the Shoran dials, which are

calibrated to read, in hundredths of a mile, the distance between the aircraft and each of the Shoran ground stations.

En route to the survey area, the bird which houses the magnetometer, is lowered from the plane's belly via a specially designed hoist.

For approximately 5 hr., the craft flies at about 1500 ft. altitude and 150 mph over the "traverse"—the 75-mi. line, and the magnetometer constantly measures the varying magnetic intensity of the earth's field. This is recorded automatically on a chart in the plane.

As the flight progresses the Shoran operator in the plane takes his dial readings and directs the pilot, who must keep the plane on course.

▶**Aerial Camera's Role**—Simultaneously, an electrically-operated camera takes aerial strip pictures so that known ground marks may be used to aid in charting the route flown.

Through code numbers simultaneously placed on the magnetometer chart, the Shoran dial pictures, and the ground photographs, a continuous coordination of all three units is provided.

After each day's operations, the data are turned over to the field office crew for processing and mapping. Subsequently, data are sent to Gulf laboratories where it is used to complete large scale contour maps, for interpretation of data in greater detail.

▶**Final Steps**—The information revealed permits geophysicists to "high-grade" a region, selecting for further study those sections which seem to possess favorable oil possibilities. Into them may be sent crews to still further narrow the search by using a portable gravimeter, and finally seismographs which afford data for a complete subsurface structural map forming the basis for drilling operations.

Gulf officials state that technical data afforded by reconnaissance tools such as the magnetometer, gravimeter, and seismograph, have reduced the odds against oil prospectors from approximately 16 to 1 to 5 to 1 in exploratory searches.

They also feel that the magnetometer's sensitivity would make it an excellent tool in a search for other minerals. In time it is expected to add substantially to present knowledge of underground deposits other than oil, and may well lead to new discoveries of iron and other mineral resources, the depletion of which in recent years is considered to have assumed somewhat serious proportions.

Gulf has made its prospecting tool available to the oil and mining industries generally through licensing.

Currently, two aerial survey organizations, Aero Service Corp. and Fairchild Aerial Surveys, Inc., have been licensed to use it and are engaged in aerial magnetic survey work.

Research Review

Helicopter Instability Investigated

NACA research evaluates flying qualities of copter to determine minimum requirements for future design.

It is now generally known that the helicopter is considerably more difficult to fly than the conventional airplane.

Two of the reasons for this difficulty are because the copter has one additional control (collective pitch) to be operated and the power controls (collective pitch and throttle) must be operated almost continually in conjunction with the flight controls during operations near the ground due to the rapid variation in power required to operate the craft at low or zero speeds.

However, principal reason for the difficulty in helicopter flying—its undesirable stability characteristics—has been little known and comparatively unexplored until the past year.

▶**Research Program**—To assess stability and control qualities of the helicopter and determine minimum requirements for future design, the National Advisory Committee for Aeronautics has conducted extensive flight tests with a Sikorsky type (Navy HNS-1, Air Force YR-4) at its Langley Memorial Aeronautical Laboratory, Langley Field, Va.

These flight tests are a phase of a broad NACA copter research program which includes investigations of aerodynamics, structures, vibration and flutter.

First results of the flight test phase of the program are now available in "Notes on the Flying Qualities of Helicopters," a paper prepared by NACA engineers John P. Reeder and F. B. Gustafson and presented to the Fourth Annual Forum of the American Helicopter Society, Phila., Apr. 22, 1948.

▶**Forward Flight** — At comparatively high speed (60-90 mph.) the copter used in the tests displayed longitudinal instability manifested by a tendency to diverge in pitch.

Positive (nose up) pitching proved the more troublesome as it precipitates or intensifies stalling, which, in turn, tends to increase the upward pitching. The maneuver is extremely rapid and unless the control is moved promptly, control of the craft can be lost completely.

As the positive pitch increases the control must be moved all the way forward requiring an uncomfortable amount of pilot exertion in the course of a cross-country flight.

Negative (nose down) pitching is less severe and may be corrected by comparatively short movement of the control, but the return of the craft to trim is normally followed by positive pitching with its attendant difficulties.

▶**Instability Cause Probed**—To determine the cause of this instability, several sources were explored.

It is well known that a flapping rotor tends to tilt to the rear as speed is increased, slowing the craft back to its original speed. This indicates that the rotor is stable with respect to speed.

Wind tunnel tests have shown that the helicopter fuselage, used in the flight tests, was unstable but this fuselage instability was outweighed by the stability of the rotor.

Tests also indicated that the stick force gradient with respect to speed was small. Thus, the instability could not be caused by either stick-fixed or stick-free instability with speed.

Only remaining source of the difficulty is instability with angle of attack created by the flapping of the rotor.

If the copter rotor is subjected to an angle-of-attack change in forward flight, then for constant rpm. the advancing blades are subjected to a greater upward accelerating force than the retreating blades because the product of angle of attack change and velocity squared is greater on the advancing side.

This creates a flapping motion which tilts the disk in the direction of the initial change, thereby creating an unstable moment.

This instability is manifest to the pilot as he moves the stick aft about one inch and returns it to neutral quickly. The helicopter will begin a divergent oscillation reaching 5 deg. up, 10 deg. down, 10 deg. up, 20 deg. down, 25 deg. up, etc. until the pilot takes corrective action.

The period of the motion is about 14 sec. and it about doubles in amplitude each cycle. Accelerations follow the motion closely with successive increments of + .4 G and — .3 G.

▶**Higher Speed Tried**—This test was made at an airspeed of 40 mph. At 65 mph. the effect is considerably different. The copter nosed upward and then downward and continued its downward pitch until after 9½ sec. the pilot recovered.

However, the following upward pitching accelerated past neutral and the control stick reached its forward stop 2 sec. before the acceleration reached its peak of 1.7 G.

During this maneuver the pilot reduced collective pitch to about 6 deg. to reduce the acceleration and the rpm. went above the placard limit. The craft was rolled quickly for recovery as in a wing-over and needless to say, the pilot was considerably disturbed.

▶**Acceleration Increment**—These two time histories indicate the marked effect speed has on the instability with angle of attack and the severity of the upward pitching at high speed.

A continuation of these tests provided data from which it appeared that at the flight condition considered dangerous, the increment in normal acceleration from the 1 G condition that had been reached was usually about ¾ G, regardless of forward speed.

From this it appears that the acceleration increment is a much better criterion for the flight condition at which recovery must be started than the more commonly used attitude angle. Rate of deviation from steady trimmed flight is low in the 40-55 mph. range indicating satisfactory stability. At speeds lower or higher than this, however, the increment in G per unit time increases.

▶**Horizontal Tail**—One cure for this instability of the helicopter with angle of attack is the use of horizontal tail surfaces, since the instability is greatest at the highest speeds.

Actually, these surfaces can be very small, only about 8 sq. ft. being required to stabilize a two-place copter.

Use of a tail surface presents a problem, however, in hovering or vertical flight in which there is no longitudinal flow over the surface but considerable vertical flow. This can be minimized by using a biplane tail, for example, which would reduce the area presented to the vertical flow by half, or by the use of a rotating horizontal tail which could float freely with the vertical flow but remain rigid during forward flight.

Another problem posed by a tail surface occurs when a change is made from forward to climbing or autorotative flight since the attitude of the fuselage remains substantially constant while the flight path angle changes.

It would appear that for high-speed, high-power designs, the tail surfaces might be connected to the pitch controls or be made free floating.

▶**Control Sensitivity** — Although adequate instruction and flight experience usually minimize its effects, the extreme control sensitivity of the helicopter constitutes a handling problem.

This is particularly noted in roll and the copter actually approaches a steady rate-of-roll in about the same time as does an airplane. And the helicopter used for the tests actually demonstrated a maximum rate-of-roll as great as some modern fighter planes at the speeds for their maximum rate-of-roll.

Actually, this characteristic results from the helicopter's lack of damping rather than high control power and its damping is only a fraction of that of airplanes.

▶**Effect of Rotors** — Control force gradient of the helicopter exhibits erratic characteristics with different rotor configurations.

Whereas the control resistance to movement should increase steadily with movement, some rotor blades produce just the opposite effect: the control becomes increasingly insensitive as it is moved. Others display erratic effects such as an increase in resistance followed by a momentary lessening followed by a further increase, which is completely unsatisfactory to the pilot, who uses the stick force as his only immediate measure of the degree of control being applied.

▶**Lag Explained** — One of the early criticisms of the copter was excessive lag in the control system, but this flight test research program has shown this not to be literally true.

The helicopter reaches its maximum angular acceleration only about 0.1 sec. after the stick reaches its position while a time of 0.2 sec. is allowed for airplanes.

The lag is actually an optical illusion since, in hovering flight, the helicopter does not follow the inclination of the thrust vector immediately because of the mass of the machine.

This control sensitivity could be lessened by changing the control system gearing but this might prove undesirable through its limiting the control available for trim. Sensitivity might also be overcome by increasing the damping which would reduce the rate of roll. This could be done by increasing the control lag using different rotor characteristics.

Control lag should not be increased to more than 0.2 to 0.3 sec., however, or it might lead to over-control of a more serious type involving large amplitudes.

Control system friction, however, should be reduced to a minimum.

▶**Vertical Descent**—One phenomenon of the helicopter occurs during vertical descent when the power is insufficient to maintain less than 500 fpm.

The craft slowly increases its rate of descent until about 500 fpm. is reached, when the machine begins to shake, roll, yaw, increase its rate of descent, vary its rpm., and nose down to recover speed despite application of rearward control.

This behavior occurs, usually, at high power when the power is only slightly less than that required to hold the 500 fpm. rate. At higher rates up to 1500 fpm. no trouble was encountered.

This phenomenon can be explained by the fact that in hovering a downward flow of air occurs through the rotor, whereas, in a power-off descent an upward flow of air through the rotor takes place.

Somewhere between hovering and a completely power-off descent (about 500 fpm. in this case), the air neither flows up nor down through the rotors but apparently moves with the rotor blades in a turbulent mixing action with the air outside the rotor disk.

▶**Just After Takeoff**—Another phenomenon not yet fully explained occurs immediately after takeoff when the copter is accelerated rapidly from hovering flight.

At about 20-30 mph. it suddenly pitches up and full forward control is required to check the motion.

Fortunately, the forward acceleration has been low enough to permit full control to accommodate the situation but if an extremely fast start is made a complete stall can result.

From the flight test program, it is apparent that the helicopter's instability with angle of attack is the problem most urgently requiring solution. This phase is now being explored by NACA and the services. If the craft can be provided with stick-fixed stability with respect to angle of attack the danger of loss of control would be virtually eliminated and friction or pilot restraint of the stick would not affect the machine's tendency to maintain steady flight.

Maneuvers could be executed without reversing the stick motion and recovery could be made simply by returning the stick to the trim position. Stick-free stability could then be provided by simple mechanical means such as springs.

Altitude Test Facility Constructed by PAC

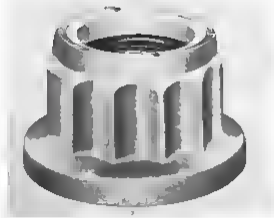
A high altitude test chamber which accurately simulates pressure conditions found at 50,000 ft. has been constructed by Pacific Airmotive Corp. at its Burbank, Calif., plant.

Facilities for extreme temperature and air contamination tests have also been provided, and the new unit's flexibility will permit such work as testing the effect of cabin-door slamming on interior pressure as the outflow load is suddenly shifted to regulator valves.

The chamber was built by PAC for experimental and production testing of cabin pressurization controls manufactured by it. Test work can be controlled from both inside and outside the chamber, and complete instrumentation is provided at both stations.

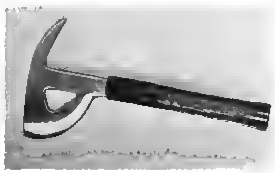
PAC has offered the new test facility to West Coast aircraft manufacturers for pressurization studies in connection with the development of new, high-altitude aircraft.

NEW AVIATION PRODUCTS



High Strength Nut

New high tensile, double hex nut, Type EB, designed to develop 185,000 psi minimum in NAS high strength aircraft bolts where weight and space limitations are major factors, is being offered by **Elastic Stop Nut Corp. of America**, 2330 Vauxhall Rd., Union, N. J. Interchangeable with existing internal wrenching nuts, design permits weight and height reduction of 66 and 50 percent respectively. Claimed to offer aircraft engineers possibilities of further reduction in size of wing fitting forgings, engine mount brackets, etc., additional features include Nylon locking collar, forged steel body, cadmium plated, bearing surfaces square with axis of threads within 1 deg. for nuts up to and including ½ in., and ½ deg. for nuts ⅝ in. and larger, plus self-locking in any position on bolt or stud.



For Rescue Work

Crash axe for ripping metal fuselages to release persons trapped in crashed and burning airplanes is distributed by **Air Associates**, Teterboro, N. J. For use from inside or outside the craft, one-piece, all steel tool has insulated handle to withstand 20,000 v. Axe weighs 2¼ lb., is 15 in. long.

Analyzes Solder

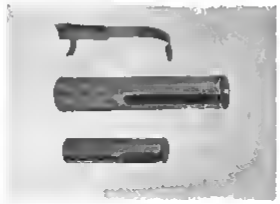
Portable, 4½ lb., tin content indicator, checking instrument for solder quality analysis, is announced by **Wheelco Instruments Co.**, 847 W. Harrison St., Chicago, Ill. Unit consists of high resistance pyrometer and dual thermocouple extensions, one with lead container, other with solder scoop. Meter movement contains baked processed coils, supported by two lapped pivots resting in sapphire jewels. Mirrored scale, 3⅛ in. wide, is calibrated in divisions representing percentage of solder's tin content. Indicator's steel sensing unit comprises two rigid tubes with sample cups mounted on ends. Method of obtaining tin content percentage is based on difference in temperature between pure lead standard and lead-tin alloy sample, while materials pass from liquid to solid consistency.

Bonds Metals

Adhesive film, "Scotch-Weld," claimed to provide metal-to-metal bond resistant to shear tests up to 3500 psi, is available from **Minnesota Mining and Mfg. Co.**, 900 Fauquier Ave., St. Paul, Minn. Film is transparent, roughly resembles cellophane, is provided in rolls like tape, and is not tacky. It's stated to be 100 percent adhesive, with no supporting material in film. Product is placed between units to be bonded and is cured by simultaneous application of heat and pressure—heat of 300 to 500 F. for 5-60 min. and pressure of 25-100 psi, varying with type of bond desired.

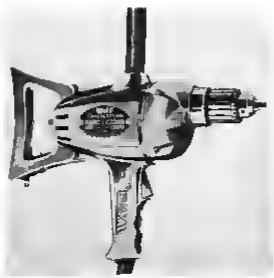
Thin Insulation

New type inorganic electrical insulation with asbestos base is announced by **Johns-Manville Corp.**, 22 East 40 St., N. Y. 16, N. Y. Known as Quinterra, material is described as possessing properties of thinness and electrical insulating strength never before attained in flexible, inorganic asbestos sheet. In appearance it resembles paper and is furnished in long lengths in roll or tape form. Material, which can be varied from 1 5 to 20 mils in thickness, is of closed structure, and has no holes or interstices. Stated is that minimum dielectric strength at room temperature is 250 vpm. Value increases with continued exposure to temperature and becomes 400 vpm. at 300 deg. C. Also claimed is that material is non-combustible, remaining unaffected by heat even when exposed to high temperatures for a long period of time.



Aids Blind Riveting

Spring ejector for pulling heads of guns used to install blind rivets has been developed by **Cherry Rivet Co.**, Los Angeles, Calif. Device assists in ejecting stems, formerly shaken out, of pull-through hollow rivets. Equipment is optional addition to company's G6H and H4O type pulling heads.



Electric Drill

Adaptable for aircraft production and maintenance work is ¼-in. general duty electric drill announced by **Fred L. Stuart**, 309 E. 40 St., New York City, U. S. representative for S. Wolf & Co., London, England. Motor frame and gear box are pressure die cast. Gears are nickel chrome, high frequency heat treated. Gear spindle bearings are oil impregnated porous bronze, armature bearing is self aligning, and chuck spindle thrust bearing is ball type. Side handle has trigger switch with tubular handle removable. Lever handle drill stand is available.

FINANCIAL

Airline Merger Signs Increase

Goal of stronger route systems transcends personalities as discussions continue despite past turndowns.

Airline mergers, long an active subject, appear to be moving closer to realization. In the jockeying for position, merger possibilities have broadened with an increasing number of carriers showing keen interest in various combinations.

The current merger discussion cycle was started a few months ago when officials of Delta and National confirmed reports that serious consideration was being given a possible combination of the two systems. In the background, reports persisted that Capital ultimately might be fused into the National-Delta combine. The temporary exclusion of that carrier was attributed to its troubled finances.

In the midst of this projected combination, Braniff is reported actively booming Capital. A Braniff-Capital merger is known to have strong support from Pittsburgh banking interests, as well as from certain New York investment banking elements.

▶**PAA May Bid**—To add to the jig saw puzzle, it is believed that Pan American Airways may be inclined to bid for National if the international operator's request for a domestic route from New York to Miami is turned down by the Civil Aeronautics Board. A CAB examiner has recommended that Pan American be given such a new route grant with certain restrictions providing for through traffic to and from Latin American points.

The atmosphere surrounding National as a key merger possibility is believed to be more favorable now than at any time in the past. Some settlement would have to be made with the striking pilots of the Air Line Pilots Association before an National amalgamation could be implemented. It is difficult to visualize ALPA members of other carriers coordinating services with National's present pilots.

In the rumor stage for some time has been a Colonial-Northeast combine. Questions of price appear to be a major stumbling block in this instance. The more ambitious merger projectors go so far as to include either one or both of these operators in a possible consolidation with Delta-National-Capital.

Consolidating airlines would appear to be much easier than merging railroads. Airlines have great flexibility, with their chief asset a franchise which gives them a "right-of-way" in the sky. There is no heavy commitment by the air carriers comparable to that expended by the railroads in rails, ties and other fixed property investments.

▶**Obstacle Course**—Actually, the airline merger course is a most intricate one, beset by many obstacles. Many have tried, but thus far none has succeeded in effecting a bona fide merger since commercial aviation came into its own with enactment of the Civil Aeronautics Act of 1938.

The hurdles have been many and complex. Strong personalities of airline chiefs always clashed at the showdown on who was to become head man in any merged system. There has been reluctance for anyone to take a subordinate position. Once agreement at the top level is accomplished, proposals must then obtain sanctions from the separate boards of directors and after that approval from stockholders. Dissident groups can place any compromise plan in jeopardy.

The biggest obstacle remains in obtaining CAB approval. Under the Act, the Board is required to approve the consolidation, merger, lease, operating contract or acquisition of control of an certificated air carrier. The Board must find any such proposed arrangement to be in the public interest before it can become effective. Further, the law directs the Board not to approve any arrangement which would "result in creating a monopoly . . . or jeopardize another air carrier not a party to the agreement."

▶**Past Performance**—Armed with this directive, the Board and its predecessor, the Civil Aeronautics Authority, were called upon to approve mergers and consolidations proposed in the past. The few cases on record provide significant precedents in evaluating the possibilities for currently projected combines.

The Authority, in 1940, approved TWA's acquisition of Marquette, a small midwest feeder. A year earlier, this same proposal was turned down by the Authority with the assertion that the purchase price was excessive. The price was reduced.

Western Airlines was allowed, in 1943, to acquire control of Inland Airlines, a smaller operator in the Montana-Dakotas area.

These two acquisitions were the only ones to gain official approval. The issues were non-controversial with little opposition from competing carriers.

▶**UAL Turned Down**—Other merger proposals were less fortunate. After approval by a special CAA examiner, the Authority in 1940 denied United's application to acquire Western Air Lines. Main reason given was that the size and control of United would adversely affect the competitive position in that area. It is interesting to observe that at the time of the proposed exchange of United's stock, a price of about $2 million was indicated for the Western properties. Last year, United paid Western $3,750,000 for only one segment, the Denver-Los Angeles route, awarded subsequent to the acquisition proposal of 1940.

American attempted to acquire Mid-Continent through an exchange of stock. This proposal was turned down by the Board in 1946 on the grounds that it would merely add to the former's bigness and no community of interest existed between the two carriers.

▶**Merger Hints**—CAB has no power to initiate action compelling the airlines to merge, although at various times individual Board members have suggested a series of combinations in both official and unofficial actions.

A notable example is found in former Chairman Welch Pogue's dissent in the 1944 decision awarding Northwest a Milwaukee to New York route and extending Capital from Pittsburgh to New York. Pogue sought to encourage Northwest and Capital to merge, thus avoiding the resultant duplication of route mileage. Significantly, too, former Vice Chairman Edward P. Warner, also opposed to the majority decision, was inclined to an equipment interchange agreement. Hence by a bare three to two decision, the Board added duplication to the industry's mileage.

▶**Trend Reversed**—The trend now appears to be moving the other way, with efforts devoted to retention of existing route mileage as much as possible.

Some observers believe that the 15 main trunklines can be cut to at least twelve and possibly to ten, yet provide effective competition, without excessive duplication of mileage, and maintain a strong airline network.

What could not be accomplished on a voluntary basis is now being dictated by dynamic economic forces. Strong individual personalities may be submerged in the cause of a sounder air line pattern.

—Selig Altschul

London Letter:

BOAC Reports on Reorganization

As government finally lets corporation get new planes, line has to move to cut its operating costs.

BOAC has been put on the spot very nicely by the British Government. But the big nationalized airline likes it.

For the second time since the war, the Government has relaxed the long-standing "Fly British" dictate to British aviation. Before the war, BOAC's predecessor, Imperial Airways, suffered under a similar directive.

After prolonged inter-departmental struggles that had to be taken up to Cabinet level for mediation, the Government reached the inevitable compromise, and BOAC will be allowed to buy 22 Canadair IV transports.

Seven Canadairs will go on BOAC's U. K.-Montreal route, the other 15 on routes from U. K. to India and the Middle East.

▶**Planes Next Year**—The Canadairs, of course, aren't in storage just waiting for the hangar doors to roll open and the BOAC crews and passengers to come aboard and take off. They still have to be built. Reports from Montreal indicate that the almost deserted Canadair factory there will spring to new life, with some 5000 extra employes taken on to fill this new order. (Best estimate of delivery dates to BOAC: 15 planes within the next twelve months, with the rest following soon after.)

The planes, less engines, will cost about $700,000 each. Payment for them has been arranged in such a way that they do not represent an immediate outlay of Britain's scarce supply of dollars—an important consideration these days. The Rolls-Royce Merlin engines, of course, will be paid for in sterling. Shipments of the engines are already en route to Montreal.

The Government justified its decision to the British taxpayer by the assertion that the Canadairs' greater payload capacity actually would save the Exchequer money—an amount estimated at around £5,000,000 over the next five years—compared with the probable results if BOAC were forced to use the British-built interim short-range transport, the Tudor II, with its lower earning capacity.

What was implicit, but not stated, in the Government's concession allowing BOAC to acquire these additional non-British planes was that the time for airline operating deficits was running out, and that the corporation would have to match this deficit-cutting maneuver with economies of its own.

▶**BOAC's Reaction**—The Airline was all set to accept and respond to the Government's implied "economize" directive.

Morale of BOAC personnel, at least at London headquarters, got a big boost from the Canadair decision. The corporation had been pushing for the purchase of more Constellations—or some other aircraft with profit-making possibilities—ever since it acquired its first Connies nearly two years ago. The Government's concession on the Canadairs it regarded as a major victory for its point of view.

It was an opportune time, then, to disclose the reorganization scheme that BOAC has been preparing to ever since Whitney Straight took over the chief executive post last summer.

▶**Two Divisions**—BOAC will now be divided into two main divisions, instead of three as at present: the Eastern and the Western. These divisions will take over all responsibilities (including financial success and technical excellence) for operations and bases eastward and westward, respectively, from London.

Both divisions will have headquarters in London.

The Eastern Division, under J. W. S. Brancker, will amalgamate the operations of the African and Middle East Division with those of the Far East Division (east of Bahrein) and by running two divisions with the central staff of one eventually will cut down the overhead expense by half.

The Western Division, under Vernon Crudge, will theoretically be responsible for all services west of London to Australasia but will concentrate principally on obtaining the maximum possible traffic originating in the U. S. and Canada.

Under the two main divisions, there will be separate lines, each operating a single type fleet of planes and charged with getting out of that fleet the maximum load-carrying capacity at the lowest cost, and areas, responsible for providing ground services at the lowest cost and for developing the maximum earnings from their respective fleets.

▶**Management and Personnel**—Both services will draw on the services of central personnel, technical development, finance and accounting departments, located in the U. K. BOAC's maintenance department will be run as a commercially independent operation.

ARGENTINA'S MODERN AIRPORT

The $60,000,000 Argentine National Airport, Ezeiza, is nearing completion and the official opening is expected before the first of the year. In foreground of above photo is the nearly completed international passenger reception building. Also nearly finished is an identical building for domestic passengers. Cars and buses drive into the U in the center of the building and planes load on the outer three sides. Left background is the four-story administration building. At top is the six-lane superhighway which leads to Buenos Aires, a half hour drive.

and may take on outside contracts.

Management will be vested in a committee of the Senior executives of the divisions and central departments, including heads of public relations, legal, medical, and auditing staffs, and such advisors as Sir Frank Whittle, the gas-turbine pioneer, who joins the corporation to advise on the operation and development of gas-turbine-powered aircraft.

This reorganization will not mean radical slashes in personnel. "Rationalization" of the staff has been going on gradually for over a year now, resulting in a reduction of two to three thousand in the number of employes from the peak of over 23,000 a year ago. This is the process that will be continued, not filling all of the vacancies that arise through normal wastage, because of ill-health, retirement, etc., doubling up of the work, and scrutinizing the job much more carefully before appointing replacements.

▶**Still Too Many Types**—Most frequently offered explanation for BOAC's past deficits has been too many different types of planes had to be maintained, and many of these were makeshifts that were uneconomical to operate.

The 40-passenger Canadair will more than pay their way.

They thus overcome the second half of the difficulty. But, together with the Handley-Page Hermes IVs due for delivery early next year, they add almost as many types as they replace.

However, the Canadairs do fit smoothly into the plan to make each line a single-plane type operation.

Here's how the present and near future BOAC fleet shapes up on operations:

• **New York to-London** now served by Constellations eventually will be served by the six Stratocruisers that are on order. The six Connies now flying this route and the Montreal-to-London route probably will all be kept on the New York-to-London services, as BOAC intends to make a brave fight for a bigger share of this traffic.

• **Montreal-to-London**—Seven of the new Canadair will replace the Connies now flying this route.

• **London-to-Sydney**—The five Connies recently bought from Irish Air Lines will go into service here beginning in August or September, replacing the Hythe flying boats. These five Connies, with Quantas Empire Airways' four, already flying, will more than double the present seating capacity on the fast-schedule service, and frequency will be stepped up from a total of four services a week to at least six.

• **London-Middle East**—The Hermes IVs are counted on for this route to replace the Yorks.

• **London-to South Africa**—The Solent flying boats, which inaugurated a leisurely four-day luxury service on this run in May of this year, will be continued as long as they continue to pay their way and prove that there is a demand for such accommodations. Eighteen of these four-engined boats have been ordered, of which ten are still to come.

• **London-to-Hong Kong and Tokyo**—Solents eventually will replace the Plymouth and Hythe flying boats now on this route.

▶**Freighters**—Fifteen Tudor IVB pressurized freighters are to be added to the BOAC fleet, which, BOAC claims, will give the corporation the biggest fleet of freighters in the world. These Tudors will be converted from the Tudor I and II aircraft.

Conversion of Tudors I and II into the Tudor IVB pressurized freighters—a process involving a lot more than just changing the fuselage length and adjusting the trim—will keep at work most of the 9000 employes of A. V. Roe & Co., Ltd., in Manchester, the firm that built the Tudors.

BOAC thinks it may have something if the Tudor IVB turns out well (British South American Airways reports excellent performance by its pressurized Tudor IVs.) It has discovered that pressurized cargo offers some highly profitable potentialities, particularly on its Far Eastern routes, where already it is moving a large volume of medicines (such as streptomycin which must be kept at critical temperatures more readily controlled in a pressurized cabin) and transporting a goodly number of animals (kangaroos, monkeys, etc.) to British zoos and elsewhere.—**F. T. Brewster.**

Rules for Air-India

NEW DELHI, India—As majority stockholder in Air India International, India's first scheduled foreign service, the Indian government has taken stringent measures to assure itself competitive advantages.

Principal rules:

• No company may charge passenger fares below prevailing rates over any route served by a scheduled operator, either domestically or internationally.

• No charter operator may advertise.

• No foreign-bound passengers may be booked by chartered aircraft unless the Indian airline on the same run is unable to carry them "within a reasonable time."

• All charter bookings must be handled by an approved Indian line—and Air-Indian International is one of the two approved.

To say the rest of the industry is peeved is putting it mildly.

Bolivian Air Force Wants to Be Airline

LA PAZ, Bolivia—Lloyd Aereo Boliviano, the 23-year old government-sponsored airline, is having trouble with the country's Military Air Force. The Air Force, with eight C-47s, wants to go into the airline business, in competition with LAB.

▶**Lower Rates**—Further, the Air Force says it will fly at lower rates, hitting cities that are not now covered by LAB. The Air Force request is causing confusion in Bolivian governmental quarters as the government owns 55.36 percent of LAB stock. It faces the bleak prospect of cutting down its own profits from LAB, should it give the official nod to the Air Force request.

This situation is even more complicated by the fact that LAB intends to increase its capital by issuing more shares. The government, in order to maintain its position, must purchase a large amount of this stock—enough for it to keep the controlling interest. Meanwhile, the Air Force has little to do and wants to put its C-47s to a commercial use.

▶**1947 Profits**—LAB, apparently the pawn in the Bolivian air-checkerboard, has made rapid strides. Its profit of $319.77 in 1926, after one year of operation with two German Junkers, contrasts with a profit of $13,918.21 for 1947.

During this period, the airline has constructed airports at Cochabamba, Apolo, Ascension, Camiri, Cobija, Culpina, Cuayaramerin, Magdalena, Potosi, Riberalta, Rurrenabaque, San Javier, San Borja, San Joaquin, Santa Ana, Sucre, Tarija and Trinidad.

▶**Seeks Loan**—LAB is dickering with the U. S. Export-Import Bank for a $2,100,000 loan which it would like to use to purchase aircraft, including some four-engine transports. A top official in LAB has indicated that the airline is interested in purchasing new Martin aircraft, probably 2-0-2s.

But LAB is confused about how things things will end. Although it has a contract until 1951 with the Bolivian government giving it exclusive commercial flying rights in Bolivia, military pressure may not permit the government to renew the contract for another ten years. The Export-Import Bank, however, insists that the contract be renewed as one of the conditions for a loan. Meanwhile, LAB is itching to start international flights. It can't unless it gets aircraft. It won't get aircraft unless it gets money. It won't get money unless the military gives up its plans for flying commercially. But the military is itchy, too.

SALES & SERVICE

FIRST M-18 is delivered to W. S. Grant (right) by Mooney President Yankey as . . .

. . . production goes forward in the Wichita plant that will produce 50 planes this year

Mooney Delivers First Plane

With an NC for production model of single-place M-18, Wichita company plans production of 50 this year.

WICHITA—A new test of the market potential in the U. S. for the single-seat ultra-light airplane will be provided by the tiny Mooney M-18 which has just received Civil Aeronautics Administration certification here for its first production airplane.

▶**Veteran**—Product of Al W. Mooney, veteran designer of the Culver Model V and many of the Culver radio-controlled target planes, the trim little airplane looks like a midget fighter with its low wing design and retractable landing gear.

Its primary advantage is its economy of operation, due to the use of a 25-hp. Crosley Cobra engine, adapted from the Crosley automobile. Plane will be priced at around $1600, the lowest-priced airplane on today's market.

▶**Plane Delivered**—W. S. Grant, Santa Monica, Calif., distributor for Mooney Aircraft, Inc., took delivery on the first production airplane, after it received its NC from Charles G. Yankey, president of the company and former president of Culver. Yankey is also a Beech Aircraft Corp. vice president.

As Grant prepared to fly the airplane home, he estimated that it would cost him only $6 to $7 for operating expenses on the 1200-mile trip.

▶**Cheap to Operate**—On a recent trial run Bill Taylor, chief test pilot of the company, flew 1682 miles in less than 20 hr. at an average cruising speed of 84.6 mph. and with a fuel consumption of only 1.55 gal./hr. The company has stated that the airplane can be flown 100 miles with a fuel cost of only 50 to 60 cents. The M-18 carries only eight gallons of fuel, but this gives the plane a range of approximately 400 miles.

President Yankey said that the general objective in development of the M-18 was to produce an airplane with low operating and maintenance cost, good safety characteristics and simplicity of operation.

▶**Safe and Efficient**—Designer Mooney, who is vice president of the new company, has provided a coordination of controls through interconnection which enables the pilot to fly the airplane at the most efficient control settings, thereby avoiding marginal and dangerous settings.

"This means," Yankey said, "that the pilot can take off, climb, cruise, approach and land in the safest and most efficient manner with assurance and confidence."

The M-18 stalls with ample warning, and in a stall, it has no tendency to roll; it merely drops its nose and recovers with little loss of altitude, the company states. This characteristic results from a Mooney designed and developed "safe trim" tail. The entire horizontal tail section is hinged and connected with the flaps to insure a safe trim of the craft at all times.

Because of its stall characteristics, Yankey said, warning instruments are "needless and useless."

▶**Easy Landings**—The M-18 controls are in trim with power on or power off and do not need or have trim tabs, thus relieving the pilot of the necessity of retrimming the airplane. This characteristic is not found on any other present-day plane.

The single-seater's retractable landing gear is raised and lowered by a lever which enables the pilot to know that his gear is properly down for landing.

▶**Speed**—The plane's sea level cruising speed is in excess of 85 mph. Top speed is in excess of 100 mph. The estab-

lished rate of climb is 450 fpm., and the service ceiling is 12,000 ft.

The plane is constructed of metal, plywood and fabric. "We used the best material for each spot," Mooney said in describing construction of the plane. All essential instruments are included —airspeed indicator, compass, altimeter, tachometer, oil pressure and temperature gauges, ammeter, water temperature and fuel gauges.

Wing span of the M-18 is 27 feet, length 18 feet, height 6 feet 9 inches. A Sensenich fixed propeller is standard equipment.

Air scoop on the production model has been moved backward to be in line with the wing. Gross weight is 700 pounds.

▶ **50 Planes**—Mooney Aircraft owns its landing field and plant facilities east of Wichita and already has announced plans to produce 50 of the lightplanes by year's end.

This is Al Mooney's eighteenth plane design (thus M-18) and is the result of more than 20 years experience in design and development of lightplanes. Thus is the culmination of Mooney's purpose to provide a safer and more

Close-up of Mooney M-18 cockpit

economical means of transportation," President Yankey declared. "It affords the lowest cost transportation of all means now known. It means that an airplane now can be used for personal transportation in business activities because of the economy involved."

VA Policies Under Fire

Documentation of outstanding case histories in rejection of veterans seeking flight training by the Florida regional Veterans Administration office is being undertaken by the Florida state aviation division. The project was started after analysis showed that only 26 veterans in the state were approved for flight training out of 99 applications in the month of July.

Bill Tunsend, Flottorp sales manager, compares new prop, right, with old

New Propeller Resists Abrasion

Flottorp introduces "armor coated" propeller for use on all planes up to 250 hp., including popular type craft.

A new improved fixed pitch Flottorp propeller, "armor coated" with an abrasive resistant plastic, has been announced by the Flottorp Manufacturing Co., Grand Rapids, Mich.

The propeller is approved by CAA and is available for installation on the following planes: Aeronca 65 hp. Chief and Champion, Cessna 120 and 140, Ercoupe 415C, Luscombe 8A, 8E and seaplane, Piper J3 and J3 Floatplane, JH, J5A and Super Cruiser, Stinson Voyager, and Taylorcrafts. It will soon be available in additional sizes for almost any airplane up to 250 hp. class.

The new plastic coating applied to a conventional wood core gives the propeller a new glass smoothness, the manufacturer reports, which is impervious to water damage and will not absorb moisture. Its main advantage however is in resistance to abrasion. In comparison tests with ordinary wood propellers, both of which were subjected to "barrages" of sand and gravel thrown into the whirling propellers, the new Flottorp came out unscratched, the manufacturer reported, while the other propellers were "rumed."

The new "armor coated" propellers have a service record of thousands of hours of trouble free use thus far, the manufacturer states.

Approval on 15 installations of the propeller on small planes with engines ranging from 65 to 165 hp. has been announced. In several installations

Contrast between old blades and "armor-coated" blade for Beech controllable pitch prop

models are offered with choice of two blade pitches, a lower one for takeoff and climb, and a higher pitch for best cruise performance. Prices announced range from $52.50 for a 72 in. diameter propeller to $57.50 and $62.50 for different 74 in. models, and $67.50 for 76 in. models.

Utah Bans Air Shows

An airplane accident during a recent air show in Salt Lake City has led the Utah Safety Council to declare air shows taboo pending institution of "standard safety procedures" to protect lives and property. Previously, New Jersey's State Aviation Commission clamped down on air circuses and stunt flying (AVIATION WEEK, July 26).

Utah's action followed a private plane crash killing both occupants at Salt Lake airport No. 2 last July 26. The accident occurred after the pilot of the craft had been warned by officials of the Salt Lake chapter of the National Aeronautic Association not to attempt acrobatics. Show officials said neither the plane nor its occupants were scheduled to appear in the show.

Following the tragedy, Joseph Bergin, state aeronautics director, issued a memorandum to managers of Utah airports and flying schools banning all air shows until a complete study had developed "ways and means of adequately protecting lives and property."

The letter states that Utah will issue no air show permits pending drafting of a safety program and managers of airports are asked to avoid arranging for air shows until that time.

New Chicago Operation

Butler Co. aviation division, has announced the opening of an aircraft service operation at Chicago Municipal Airport in a large hangar planned to handle any aircraft from a DC-3 down to the smallest.

Operating on a 24-hr. basis, the division will provide complete mechanical service at any time, according to Don B. Reagan, manager. A pilots' and passengers' lounge is now being completed. Free porter service to planes stopping at the base for gas or overnight storage is supplied, including cleaning the windshield and vacuuming the interior of the airplane. The company stocks a complete supply of Beech parts, and is distributor for Beech in the Chicago area.

Airport System Franchise

Leigh Fischer and Associates, airport research and analysis group in Detroit, has granted Robert Pool Associates, Dayton, Ohio, an exclusive franchise to handle installation and servicing of its copyrighted Airport Business System.

Robert Pool Associates specializes in airport accounting. The Fischer franchise now makes it possible for Pool also to offer airport operators the Fischer-developed airport business management and analysis program.

BRIEFING FOR DEALERS & DISTRIBUTORS

PRICE SEESAW—As if the personal plane market wasn't confusing enough, more personal airplane prices are going down while others are going up—simultaneously! Aeronca Aircraft Corp., last week dropped prices on its three principal models as follows: A $400 cut on the price of the 145 hp. four-place Aeronca Sedan to a new pricetag of $4395 flyaway Middletown, $170 cuts each on the side-by-side two-placer 85 hp. Super Chief, and the tandem two-placer 85 hp. Champion, for new prices of $2585 and $2495 respectively.

Meanwhile unofficial sources reported Aeronca hiked its discount 5 percent to 25 percent as an added incentive to dealers.

In the opposite direction, Texas Engineering & Manufacturing Co., Dallas, announced $500 price jumps for the two-place all-metal Swift 125 in both deluxe and standard models to $4495 and $3995 respectively. TEMCO attributed the increase to rising cost of material and labor, and cited additional improvements including fiberglas soundproofing and propeller spinners. It was understood the increase meant another 2½ percent discount for Swift 125 dealers, which brings them up to 22½ percent.

Aeronca was able to make the price reduction and the discount increase simultaneously, through "manufacturing economies and overhead readjustments," John Lawler, new Aeronca president said. The readjustments were primarily curtailments of Aeronca's payroll and staff.

ADMA SHOW PLANS—Dick Bomberger, Aviation Distributors & Manufacturers Association vice president and show chairman, says the trade show scheduled at Cleveland in connection with simultaneous meetings of ADMA and National Aviation Trades Association, Nov. 15, 16 and 17, will not be a public show. Exhibitors will be limited to manufacturer members of ADMA and admittance to registrants at the two trade group conventions.

ILLEGAL FLYING CAMPAIGN—California Aeronautics Commission is asking cooperation of local law enforcement agencies, airport operators, flying schools and the public in curtailment of illegal and dangerous flying in the state. The Commission is distributing a pamphlet containing both the state aeronautics act and the Federal Civil Air Regulations governing private flying.

Staff of the Aeronautics Commission includes two air safety and enforcement officers who will direct the work in cooperation with the local agencies. A maximum of $1000 fine, six months in jail and revocation of flight privileges in the state for a year is provided by the state law upon conviction of careless or reckless flying.

FLYING FARMERS MEET—What may be the largest meeting yet of private flying's steadiest customers, the Flying Farmers is scheduled to open at Ohio State University, Columbus, Ohio, Sept. 2. Many of the agricultural aviators expect to fly to Cleveland following the National Flying Farmers Convention to take a look at the National Air Races. Convention includes one day at the University's Don Scott Airport, one day on the campus, and a trip to the Ohio State agricultural experimental station at Wooster. A flight of 12 Beech Bonanzas will carry a California flying farmers' delegation in one of the longest mass flights to Columbus.

NEW RYAN DISTRIBUTOR—Mountain States Aviation, Inc., Denver, headed by Harry B. Combs, president, and Lewis A. Hayden, vice president, has been named distributor for Ryan Navions in Colorado and Southern Wyoming. Ryan also has announced appointment of Skymotive, Inc., East Los Angeles Airport, headed by Clarence Bergren, and Signal Aviation Corp. Long Beach Municipal Airport, headed by Frank Vessels, Jr., president, as two new direct factory dealers in the metropolitan Los Angeles area.

Conejo Valley Airport Camarillo Calif., owned by Edwin and William Janss, had previously received a similar appointment. The direct factory dealers in Southern California work under immediate control of the company's sales department, while the remainder of the Ryan sales organization is set up in the conventional distributor-dealer pattern.

—ALEXANDER McSURELY

DOMESTIC AIRLINE TRAFFIC

Comparison of First Half 1947 and 1948

Carrier	First Half 1948 Rev. Pass Miles	First Half 1948 Freight Ton Miles	First Half 1947 Rev. Pass Miles	First Half 1947 Freight Ton Miles
American	572,644,000	9,156,209	651,654,000	5,767,493
Braniff	92,538,000	538,644	94,306,000	126,745
Capital	127,153,000	2,029,709	136,821,000	897,288
Chicago & So.	51,016,000	256,325	53,129,000	128,069
Colonial	16,623,000	13,399	16,519,000	
Continental	27,236,000	126,986	26,959,000	49,335
Delta	91,597,000	781,521	104,347,000	260,629
Eastern	529,415,000	2,014,218	454,343,000	725,078
Inland	12,478,000	31,027	12,469,000	10,326
Mid-Continent	44,399,000	130,544	37,838,000	25,925
National	37,129,000	401,149	89,966,000	271,886
Northeast	22,095,000	76,145	28,980,000	7,784
Northwest	152,235,000	762,397	161,861,000	751,205
TWA	410,672,000	4,264,263	358,182,000	1,800,716
United	516,795,000	8,969,120	531,637,000	3,758,619
Western	52,345,000	337,086	87,846,000	205,848
	2,756,370,000	29,888,742	2,846,857,000	12,286,966

Airline Traffic Slump Continues

1948 fiscal figures show 3 percent drop in passenger miles; first class travel market may be plumbed.

The passenger traffic slump which hit the domestic airlines in June of last year has shown no sign of an immediate easing.

With complete figures now tabulated, the 16 domestic trunklines reported flying 3 percent fewer revenue passenger miles in the first half of 1948 than in the same period last year. And July passenger business continued to rock along at a level disappointing to airline officials.

▶**Freight Rockets**—While revenue passenger mileage slid from 2,846,857,000 in the first half of 1947 to 2,756,370,000 during the first six months of 1948, the domestic trunklines showed a spectacular gain in freight business and moderate increases in express and mail.

Freight jumped 144 percent from 12,286,966 ton miles in the first half of 1947 to 29,888,742 ton miles in the same period this year. Express ton miles rose 5 percent from 13,769,787 ton miles to 14,499,130 ton miles, and mail rose from 4 percent from 16,325,934 ton miles to a total of 17,010,590 ton miles.

American Airlines flew more freight than any other certificated carrier in the first half of this year—9,156,209 ton miles, followed by United with 8,969,120, TWA, 4,264,263, Capital, 2,029,709 and Eastern, 2,014,218. By comparison, Slick Airways, largest of the uncertificated all-cargo carriers, flew 13,500,000 freight ton miles in the first six months of 1948. But Slick's 38 percent gain over 1947 was considerably smaller than that of its major certificated competitors.

▶**July Traffic Trend**—Indication that domestic passenger traffic is still in the doldrums was seen in United Air Lines' report that during July it flew 124,589,600 revenue passenger miles against 126,690,000 in the same month last year. TWA disclosed that during July its domestic "payload factor" (the percentage of available seats and space filled with revenue traffic) was about 57.5 percent, whereas the carrier estimated that 60.3 percent is its break-even figure.

Meanwhile, American Airlines spotlighted the difficulties facing the domestic carriers in their attempts to boost passenger traffic. The basic fact is, AA declared, that the total first class transportation market has fallen off drastically. By 1947, this market had dropped 39 percent to 18.4 billion passenger miles from a high of 30.3 billion passenger miles in 1945.

▶**Declining Market**—Thus the airlines have been penetrating a declining rather than a rising or even a stable market—a condition exactly the opposite of that faced by most industries in the postwar period. Even so, there has been a substantial growth in the ratio of air travel to first class rail travel, and the airlines' ability to maintain a fairly stable position in the face of a drop in the overall first class transportation market is encouraging.

In 1945, American pointed out, first class rail passenger miles numbered 26,912,000,000; domestic trunkline air passenger miles totaled 3,362,000,000, and the percentage of air travel to all first class transportation was 11.1. In 1946, first class rail passenger mileage sagged to 19,838,000,000, domestic trunkline air passenger miles rose to 5,947,000,000 and the ratio of air travel to the total climbed to 23.1 percent.

▶**Rail Travel Slumps**—Last year, first class rail passenger miles declined again to 12,261,000,000, domestic trunkline air passenger miles edged up to 6,057,000,000 and the percentage of air travel to the total reached 33.1. During the first four months of 1948, first class rail travel tumbled 11 percent relative to the same period in 1947, domestic trunkline air passenger miles eased off less than 6 percent and the ratio of air travel to the total first class market hit an all-time record high totalling 43.1 percent.

But American believes the law of diminishing returns will soon set in, if it has not already done so, on airline penetration of the first class passenger travel market. "There is a limit," AA emphasized, "beyond which this market is not penetrable."

Air Parcel Post Expands

An expansion of overseas air parcel post services, which began last Mar. 16, and the inauguration of domestic air parcel post are scheduled for next month.

The new domestic service—within the U. S. and to its territories and possessions—will get under way on Sept. 1, according to Postmaster General Jesse M. Donaldson. Overseas air parcel post, which now totals about 900 lb. daily and goes to 26 countries in Europe, Africa and the Middle East, may be extended later in September.

Post Office officials hope to start air parcel post service to South America early next month and to the Orient soon afterward. Additional European countries will be included shortly, and there are plans for instituting special overseas air parcel post rates for printed matter, commercial papers, small packets and samples.

AA Suggests Mail Pay Increase

With a record deficit for first six months, carrier sees no hope for profit unless CAB changes policy.

American Airlines, which this month reported a record $5,067,679 deficit during the first half of 1948, sees little prospect of cutting its losses by year-end unless the Civil Aeronautics Board changes its policy on mail pay.

A substantial portion of AA's first-half deficit was due to the DC-6 grounding late last year. None of American's 50 DC-6s was in service during the first three months of 1948. The craft were gradually put back in operation during the second quarter, when the carrier showed a small profit.

▶**Revenue Comparison**—American's first-half 1948 loss of $5,067,679 compares with a $3,982,878 deficit before tax credits and a $2,287,293 deficit after tax credits in the same period last year. Revenue for the first six months of 1948 was $38,549,634 against $37,772,795 in the first half of 1947. During the first quarter of 1948, when the DC-6s were not in service, revenues were less than for the comparable period last year, but second-quarter 1948 revenues were 8 percent above those in 1947.

An unusual expense burden was incurred by American during the first half of 1948 as the carrier reinaugurated DC-6 service and introduced its new Convair-Liners. Cost of training personnel for the new equipment is being charged directly to expenses as incurred. The Convair Liners were used in cargo service for a month's test period before being placed by the carrier in actual passenger operation.

Despite increased wages and other costs, AA's operating expenses exclusive of depreciation were only slightly higher in the first half of this year than in the same 1947 period—$36,868,898 against $36,450,367. On June 30, the company had about $10,000,000 in outstanding commitments for additional new equipment which will be delivered during the next nine months. It is not expected that additional capital will be required to complete the equipment replacement program.

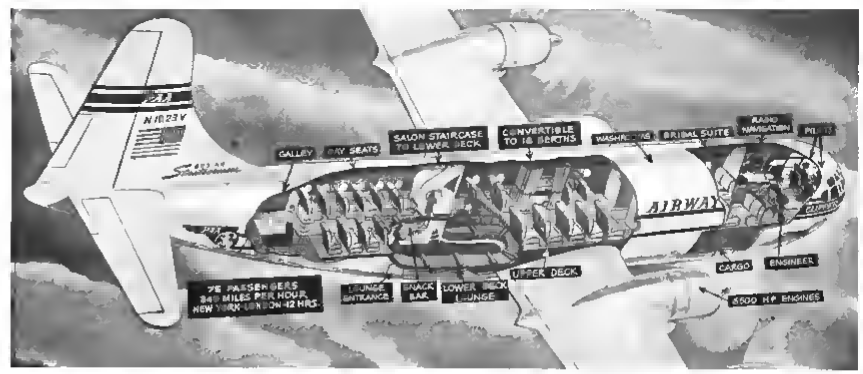
▶**Further Losses Seen**—American's financial outlook for the remainder of 1948 is gloomy barring an upward adjustment in mail pay, company officials have disclosed. They predicted that for the first time since 1934, there would be a deficit during July. First-half results indicate at least a $4,303,000 operating loss and a $5,276,000 net loss before taxes at the end of the year with present mail rates, American declared.

In setting American's mail pay at about 62.62 cents a ton mile in the "big five" rate decision last April, CAB forecast substantial gains in passenger, mail and cargo traffic and predicted the carrier would show an $8,763,000 operating profit during "a future year." American believes this forecast is both unrealistic and erroneous, declaring that it will fly only about 1,333,000,000 revenue passenger miles in 1948 against 1,379,000,000 in 1947. Comparing its own forecast for 1948 with CAB's prediction for "a future year," AA said the Board overestimated revenues by $8,000,000 and underestimated expenses by $5,000,000.

▶**New Formula Suggested**—American believes a reasonable mail rate would be "65 cents per ton mile reserved for the mail service." It asserts that the present ton-mile method of rate fixing neither recognizes the fact that mail is a preferred service nor allows for the substantial amount of weight and space which must be set aside for the mail in addition to the actual weight of mail carried and space utilized in such carriage.

"Mail received right up to the time of plane departure must be carried," American pointed out. "Yet there is no consistency in the day-to-day volume of the mail load on particular operations. It is impossible to plan for—with any reasonable degree of accuracy—the actual mail load that will be carried on any given segment of any given flight on any given day.

"This in turn prevents the carrier from utilizing fully the space not actually employed in carrying the mail, but in fact reserved for the mail, and—in the truest sense—devoted to the mail. So long as the airlines are required to give exceptional treatment to the mail—treatment not given any of their other traffic—this fact must be taken directly into consideration in the establishment of mail rates."



CLIPPER AMERICA BOASTS LUXURY

Cutaway view of Pan American Airways Clipper America—its Boeing Stratocruiser—shows luxury and spaciousness of the craft scheduled for service to Europe and Honolulu. The plane has 18 berths, including a bridal suite (which Pan Am considers will be appealing on the Hawaiian run), and 25 night seats plus 14 seats located in the lounge section.

Teterboro Sale

Port Authority adds New Jersey terminal to its airport collection.

Port of New York Authority officials and Fred L. Wehran concluded eleven months of negotiations when the Teterboro Air Terminal operator sold the Bergen County, N. J., site for $3,115,000. Under Wehran's management, Teterboro has become the country's busiest air cargo terminal.

Acquisition of the site by the Port Authority completes a four-forked program aimed at corralling what Chairman Howard S. Cullman calls "the full regional pattern of airport development." It also eliminates Teterboro as a scheduled airlines' alternative in the current battle over the higher tariffs proposed by the Port Authority for LaGuardia and New York International (Idlewild) airports. The airlines had nothing to say about the sale.

Wehran's comment was the essence of restraint. He said: "Sound business methods have demonstrated that an airport can be self-supporting." There was no doubt that he had proved his point.

Wehran took over operation of the former Bendix Airport in 1941 after paying $10,000 for a purchase option. To pick up his option, Wehran borrowed $75,000 for a down payment on the $450,000 sale price, giving a mortgage for the rest. He had just started a flight training school at Teterboro when the war came, and the Air Force took over the port as a fighter aircraft base.

When the war ended, Wehran arranged with Standard Oil of New Jersey for $1,100,000 in development loans on the condition that the firm's products be given exclusive sale at the field. With the increasing volume of traffic the airport had to be enlarged to accommodate it.

Under the contract to purchase, the Port Authority will have until Apr. 1, 1949, to assume title. It is likely that Wehran will be retained as manager of the terminal. Cullman stated that the Authority "would be very fortunate in having him." To AVIATION WEEK Wehran expressed interest in staying at Teterboro since, as he said, "aviation has been my business and my life . . ."

After the Port Authority down payment of $100,000, the transfer will be subject to outstanding mortgages totaling about $1,100,000. On assuming title, the Authority will pay Wehran the balance, of which up to $400,000 will be in cash and the remainder in Port Authority 3 percent bonds, due in 1978. These bonds are tax exempt.

Wehran told AVIATION WEEK he expects few changes to be made in the near future by the Port Authority. Fixed base operators will stay on, and the airport is continuing its negotiations with Slick Airways to have the carrier move from Newark Airport to Teterboro.

Fuel Pump Defect Blamed in Crash

Failure of the left wing in flight as a result of fire damage which had its source in a defective left engine-driven fuel pump probably caused the crash of an Airline Transport Carriers' DC-3 near Coalinga, Calif., last Jan. 28.

In making this finding, a Civil Aeronautics Board accident report also noted that the aircraft, which was carrying 29 passengers, was certificated for only 26 passengers and was seven hours overdue for a 100-hr. inspection when it left Burbank, Calif. All aboard the plane—including 28 Mexicans, a U. S. immigration official and the three-man crew—were killed in the mishap. The flight was being made by ATC under contract with the U. S. Immigration and Naturalization Service.

▶**Crew Error Noted**—CAB said the crew made a mistake in leaving its Burbank base for Oakland with the 26-passenger DC-3 instead of the 32-passenger plane assigned. On taking off from Oakland for the Imperial County Airport, Imperial County, Calif., the plane was 67 lb. overloaded. The Board emphasized, however, that while the error in taking the wrong plane and overloading the craft with three passengers not provided with safety belts indicated laxness and poor judgment by the crew, these factors did not contribute materially to the cause of the accident.

An hour and 35 minutes after the plane left Oakland, while cruising at 5000 ft., a trail of smoke or vapor began streaming from the left engine as fuel escaping from the left engine-driven fuel pump was ignited. Flames followed, and seconds later the left wing and engine dropped free from the plane, which crashed out of control.

▶**Defect Found**—Investigation showed the left wing failed as a result of fire damage, and all evidence pointed to the defective fuel pump as the source of the fire. The separating gasket in the left engine fuel pump showed signs of being fractured prior to the time of the last flight. But the defect was latent in character and one which might not have been found during a 100-hr. inspection.

CAB said that had the carrier established some means of notice, other than the aircraft log itself, that a plane was overdue for an inspection or otherwise out of commission the mistake made by the crew in taking the wrong ship might not have occurred. "A simple method of providing such notice would be placing a red tag on the pilot's control column." With this exception, no discrepancies or defects were found in ATC's operating policies or practices which could be considered contributory to the accident.

AOC SECRETARY

Cyril C. Thompson, one time vice president of United Air Lines, has been named executive secretary of the Airport Operators Council. Thompson will establish permanent headquarters in Washington. Previously he was special representative for Santa Fe Railways, acting for the railroad on policy matters affecting Santa Fe Skyways, Inc., its air cargo affiliate. Thompson will handle all administrative matters for the AOC in addition to expediting the flow of information to the membership, which includes public agencies operating major airports in 20 principal cities.

AOA Sets Record

American Overseas Airlines, the only U. S. flag carrier operating into Berlin, set new commercial records during July for traffic flown through the air corridor between Frankfurt and the German capital. The carrier flew more than 2200 passengers, 375,000 lb. of cargo, including food, medical supplies and industrial equipment, and 30,000 lb. of airmail between the two cities.

AOA has cooperated with the U. S. Air Force in "Operation Vittles" by increasing its Frankfurt Berlin schedules from six to 25 roundtrips weekly. C-54 airfreighters and regular passenger-cargo craft are being used on the route. The accelerated schedule to the German capital is in addition to AOA's regular trans-Atlantic flights—22 roundtrips weekly—three of which are New York-Berlin runs.

CAB Cites Viking On Trip Frequency

Another nonscheduled transcontinental carrier—Viking Airlines, Burbank, Calif.—has been ordered by the Civil Aeronautics Board to show cause why its letter of registration should not be revoked for knowing and wilful violation of the Civil Aeronautics Act.

Viking, which is owned and operated by Aero-Van Express Corp., has been directed to file an answer with CAB by Aug. 31 telling why its privileges as an irregular air carrier using large aircraft should not be suspended while the revocation proceeding is pending. In addition, Vikingair Transport Co., Inc., which owns and controls Aero-Van Express, Viking Airliners and Viking Airlines, was told to show cause why it should not be ordered to cease and desist from engaging in air transportation in violation of the Civil Aeronautics Act.

▶**Other Carriers Involved**—Like Standard Air Lines, Long Beach, Calif., which is involved in similar difficulties with CAB (AVIATION WEEK, Aug. 16), Viking is a member of the Air Coach Association. Third member of the group which is seeking exemptions and certificates for scheduled coast-to-coast operations—is Airline Transport Carriers, Burbank. One transcontinental nonscheduled operator—Trans Atlantic Airways, New York—has become inactive as a result of a CAB crackdown last spring.

CAB enforcement officials indicated that Viking has been operating with greater frequency than permitted by the nonscheduled exemption, particularly between Burbank, San Francisco and the New York area. They also said Viking has had agreements for combination of services and apportionment of traffic with Airline Transport Carriers, Nats Air Transportation Service, S. S. W., Inc., and Standard Air Lines which were not filed with the board.

Viking allegedly operated 15 flights between Burbank and Newark in April, boosting its frequency on this route to 20 trips in May and 22 in June. The carrier has nine DC-3s.

Airlines Welcome RFC Survey

President Truman has called on the Reconstruction Finance Corp. to make a study of the air transport industry's financial problems and to submit recommendations for their alleviation.

The move was disclosed immediately following a White House conference between the President, RFC chairman Harley Hise, Director of the Budget James V. Webb and Civil Aeronautics Board Chairman Joseph J. O'Connell, Jr., at which the airlines' general financial condition was discussed.

President Truman indicated he was extremely interested in finding means by which the air transport industry could obtain the types of financing best suited to its immediate requirements and long term development.

▶**Fast Action Sought**—Both CAB and the Budget Bureau were asked to assist the RFC in the survey, which the President wants completed at "an early date." The White House action came soon after CAB issued an invitation to the domestic trunklines for a meeting in Washington on Aug. 19 to discuss the need for an industry-wide passenger fare increase and to consider ways of achieving additional economies (AVIATION WEEK, Aug. 16).

Preparing to attend the CAB session late last week, top industry executives applauded the steps taken by President Truman. W. A. Patterson, United Air Lines president, said his company welcomed the RFC study, and C. R. Smith, American Airlines board chairman, declared the White House action offers an opportunity for cooperation in finding the answers which will permit U. S. air transportation to be maintained at its proper level of strength and efficiency.

Warren Lee Pierson, TWA board chairman, noted that one reason the airlines are losing money is that "they mistakenly and consistently have tried to offer premium merchandise at bargain basement prices." "It is axiomatic," he emphasized, "that no concern can sell below cost for long and stay in business."

YOUNG VETERAN

Capt. Joseph R. Smith, 38 years old, last month celebrated his 20th anniversary as a United Air Lines' pilot. Capt. William Green, UAL flight manager at Seattle, congratulates Smith on two decades of service during which he has logged 19,000 hr. and more than 3,000,000 miles. He now is on UAL's DC-6 run between Seattle and Los Angeles.

Luxury Touch

Resort Airlines has added new passenger service touches for its "carriage trade" on the New York to Saranac Lake-Lake Placid run. The uncertificated operator has installed individual loud speakers under the upholstery of each seat to bring the passengers all pertinent in-flight information such as speed, altitude, estimated time of arrival and weather at their destination.

Competition in Hawaii

Certification of a second carrier to provide intra-island service in the territory of Hawaii has been recommended by CAB Examiner Thomas Wrenn.

The examiner urged the Board to grant Trans-Pacific Airlines a three-year certificate to carry passengers and property only from Honolulu to Hilo, Hawaii, and to the islands of Molokai, Lanai, Maui and Kauai. TPA flew DC-3s in common carrier intra-island service from July, 1946, until January, 1948, as a nonscheduled operator. At the request of Hawaiian Airlines, only certificated carrier in the territory, a U. S. district court issued a permanent injunction against Trans-Pacific last November, restraining the company from operating scheduled common carrier services in violation of the nonscheduled exemption.

Wrenn based much of his argument for certificating TPA on the fact that Hawaiian Airlines is controlled by Inter-Island Steam Navigation Co., which operates surface vessels. He said the territory has reached the stage of economic and social development where it should not have to depend on a transportation monopoly, however efficient it may have been.

In another part of his report, Wrenn recommended that a decision be deferred on Trans-Air Hawaii's application for an inter-island all-cargo certificate until the success of the carrier's C-46 operations can be determined. Trans-Air Hawaii has been operating at a loss since its activation in July 1946, but the company believes its switch from C-47s to C-46s will prove the service is economically feasible.

2-0-2 EXECUTIVE TRANSPORT

Sister ship of the 2-0-2 airliner, this executive transport is now available for current production, according to the Glenn L. Martin Co. Comfort is a keynote of the craft, which has all the structural, performance and safety features of its airline counterpart. Cutaway sketch shows one of many possible interior arrangements.

Excursion Fares

Pan Am finds way to reduce rates without violating IATA rules.

By Stanley L. Colbert

Pan American World Airways proposes to put new trans-Atlantic fares in effect Oct. 1, deducting 25 percent from current roundtrip rates to points in Eire, the United Kingdom, Europe, Central Africa, South Africa, the Middle East and India.

Calling them "excursion fares," PAA described the reduction as "an anti-inflationary fare program designed to assist European recovery by supplying an increased flow of tourist dollars."

▶ **Long Time**—But to observers, it appeared to be more than that. Pan American has been trying for some time to find an interpretation of IATA traffic agreements that would permit the carrier to reduce its fares. Apparently the "excursion fare" title, which simply means that the purchaser must use the return portion of the roundtrip within 60 days, allows PAA to lower its rates and still stay within IATA regulations. One way fares are not affected.

Pan American's announcement brought no comment from TWA, but AOA has already notified travel agents that such reductions would be available on Oct. 1, subject to CAB approval. Sabena also announced reductions. Previously, SAS had reduced fares on its DC-6 sleeper service to Stockholm.

▶ **CAB Notified**—As required by IATA, Pan American notified the other trans-Atlantic airlines of the new fares and also has filed notice with CAB. Unlike the procedure with domestic tariffs, the Board does not have to weigh the request in terms of whether the level proposed is reasonable, but it does have to determine whether or not the fare is discriminatory.

In announcing the rates, Juan Trippe, PAA president, pointed out that "these excursion rates support our government's declared economic foreign policy for encouraging tourist travel between all countries as a vital factor for promoting trade and economic and cultural understanding."

Trippe cited the move as "another step in Pan American's continuing campaign to provide mass air transportation at prices the average family can afford to pay."

▶ **Earlier Plan**—In November, 1945, Pan Am tried to institute a one way fare of $275 on its New York-London run, a reduction of $100 from the previous rate. At that time the British government told the airline that if it persisted in its efforts to do this, the British would reduce the frequency of its flights to two a week. CAB also turned thumbs down on the plan.

In November, 1946, IATA, through its member airlines, set the fare on the New York-London run at $325, and in April, 1948, the fare went to $350.

Pan American's new roundtrip fare for this run will be $472.50, compared with a present rate of $630.

TWU Strike Threat At American Airlines

American Airlines officials and leaders of the Transport Workers Union were scheduled to confer last week on a proposed mechanics strike to protest the layoff of 78 men. A meeting early in the week brought no results.

Union pickets were already parading before the carrier's LaGuardia Field and New York offices.

American asserts that the 78 men laid off failed to accept jobs at the Tulsa, Okla., maintenance center and therefore were discharged.

▶ **Asks More Time**—Union president Michael Quill asked that the layoffs be postponed for a week in order to give more time for working out a suitable adjustment, but American is said to have refused.

C. R. Smith, chairman of the board for American, assailed the union for passing out handbills to passengers protesting the layoffs and urging the carrier to "stop gambling profits against safety."

Smith remarked, "If the line should adopt the union policy of 'no layoff' whether or not there is work . . . we would be out of business in less than a year. That policy would . . . bankrupt any company in any line of business."

No Help Needed

Recent CAB order implies flag lines handle summer rush alone.

The three U. S. flag carriers flying the North Atlantic need no help from nonscheduled operators to handle peak summer business.

This view was expressed inferentially in a CAB order issued this month denying the petition of Trans-Caribbean Air Cargo Lines, New York, for an exemption permitting it to engage in the foreign transportation of persons between the U. S. and Europe from June through October. The carrier also sought unsuccessfully an amendment to the nonscheduled exemption to permit all irregular carriers to fly passengers on a common carrier basis between the U. S. and Europe for any period the Board might find necessary.

▶ **TWA Replies**—Pan American Airways early this summer asked CAB to dismiss Trans-Caribbean's application, asserting there is no shortage of air transportation to and from Europe (AVIATION WEEK, July 12). TWA recently supported the PAA stand, declaring it was able to handle all traffic offered during May and June. In July, TWA's payload factor (percentage of available seats and space filled with revenue payload) was about 57.5 percent.

TWA said that in July, August, September and October of this year its trans-Atlantic capacity will be about 8500 seats monthly. This total, the carrier emphasized, is 50 percent above the 5645 seats it had available in September, 1947, the month of maximum capacity last year, and 66 percent in excess of the 5097 seats occupied in August, 1947, the month of maximum passenger traffic last year.

▶ **Comfortable Margin Seen**—"It is obvious" TWA declared, "that we are leaving a comfortable margin to meet any and all demands. We believe the same situation prevails on other American flag carriers on the North American run. There is no basis for Trans-Caribbean's conclusion that the immediate demand for travel between the U. S. and Europe exceeds the combined capacity of U. S. and foreign flag lines or that the European Recovery Program is being impaired by a shortage of air transportation."

TWA alleged that Trans-Caribbean "went underground" when CAB denied its application for authority to make all-expense passengers flights to Europe last year. It said the nonscheduled operator offered through travel agents regular DC-4 flights between Bermuda and Europe with local connections to U. S.

SHORTLINES

▶**Capital**—Will make charter flights carrying five teams of the All-American Football Conference and two teams from the National Football League this fall. In addition, ten college teams will use the carrier for out-of-town games. Georgetown, Mississippi State, Maryland, William and Mary, San Francisco, Youngstown, Clemson, Kentucky, Louisiana State University and University of North Carolina.

▶**Colonial**—Reports domestic operating loss for first half of 1948 was $154,615 and net loss $182,858, of which $6478 operating loss and $21,789 net loss were incurred during the second quarter. Company had a $29,629 domestic operating profit in June when it flew 3,702,000 passenger miles at a 68 percent load factor against 3,450,000 passenger miles at a 57 percent load factor in the same month last year. Colonial had a $39,635 operating loss and $39,691 net loss on its Bermuda operations during the first half of 1948.

CAB has issued the carrier an exemption to serve Saratoga Springs, N. Y., during August.

▶**Continental**—A CAB examiner has recommended consolidation of the company's three routes with appropriate restrictions.

▶**Florida Airways**—Has signed a contract with the Air Line Pilots Association. Pact provides for continuance of existing salary scales and working conditions. Revenue passenger miles flown in July were up 108 percent over the same 1947 period.

▶**KLM**—Reports net profit of $49,896 in 1947 against $311,121 in 1946. Revenues last year aggregated $39,916,800 against $26,271,000 in 1946, with freight income increasing 113 percent, mail 29 percent and passenger 39 percent. Amsterdam-Batavia revenues made the greatest increase, rising from $9,828,000 in 1946 to $13,041,000 in 1947. North Atlantic revenues rose from $4,725,000 in 1946 to $6,841,000 last year.

▶**Lineas Aereas Nacionales, S. A. (Lansa)**—Has asked CAB for a foreign air carrier permit to fly from Bogota and Barranquilla, Colombia, to Washington, D. C., and New York via Havana and/or Nassau. The Colombian line would use DC-4s.

▶**Mt. McKinley Airways**—Has asked CAB for an immediate exemption to conduct scheduled service between Anchorage, Alaska, and Seattle, Wash.

▶**Northeast**—Showed an operating profit in July, and earnings prospects are good for August and September. Load factors are high on the Cape Cod and Maine vacation runs. Company increased fares 10 percent on its Cape Cod and Montreal routes early this month and may seek similar hikes on the remainder of its system. . . . NEA celebrated its 15th anniversary this month.

▶**Northwest**—Has announced a new schedule of commodity rates from Portland, Seattle and Spokane to Chicago and points east.

▶**Pan American**—A survey conducted by the Pacific-Alaska division disclosed maintenance efficiency has increased 31 percent in the past six months. . . . Passenger traffic on the Pacific-Alaska division in June was up 43 percent over the same month last year, while cargo increased 16 percent.

▶**Southwest**—June passenger business was up 15 percent over June, 1947.

Alaska Airlines Sued

Several suits have been filed in superior court at Seattle, Wash., against Alaska Airlines in connection with the Seattle-Tacoma Airport crash Nov. 30 that claimed nine lives.

O. R. C. Stitsworth, Tacoma, is asking $125,502 for the death of his wife, while Mrs. Margaret B. Kelly is seeking $91,040 for injuries she received in the crash.

The suits allege that the plane was unevenly loaded, with baggage in front of the passengers blocking the escape hatches that it landed at 140 miles an hour at a point past the center of the landing strip (as a result, it ran out of runway), that the brakes had been in disrepair for several weeks and that the nose wheel failed to operate.

CAB SCHEDULE

Sept. 13—Oral argument in airfreight case. (Docket 870 et al.)

Sept. 27—Hearing on CAB's investigation of free and reduced rate transportation. (Docket 2737 et al.)

Sept. 29—Oral argument in TACA S. A., foreign air carrier permit renewal and amendment case, postponed from Sept. 2. (Docket 3015.)

Oct. 4—Hearing in Capital Airlines mail rate case postponed from Aug. 30. (Docket 484.)

Oct. 4—Hearing on route consolidation applications of American, Eastern and TWA. (Docket 2751, et al.)

Oct. 11—Hearing in U. S.-Alaska service case. (Docket 3236, et al.)

Oct. 18—Hearing on Board's enforcement action against Standard Air Lines. (Docket 3357.)

Dec. 1—Hearing re additional service to Puerto Rico. (Docket 2124 et al.)

PICTURE CREDITS

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ADVERTISERS INDEX

AVIATION WEEK
AUG. 23, 1948

PROFESSIONAL SERVICES—
See first issue of month

SEARCHLIGHT SECTION
(Classified Advertising)

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EDITORIAL

Washington Roundup

WASHINGTON, D. C.

New Route Mileage—Substantial increases in airline route mileage appear out the window. Equipment interchange appeals to CAB as a substitute. That means chances of a new southern transcontinental are negligible. It's part of CAB's hesitance in taking steps to increase airline competition.

Background is this: Public counsel in the Southern Transcontinental Route Case last spring asked CAB to enlarge the proceeding to include an investigation as to whether, and to what extent, the proposed service can be provided through interchange of equipment.

Prehearing conference has been held but CAB has postponed further procedural steps in the case pending its ruling on the counsel's request. It is expected that the Board will go along with this request and specifically inject the equipment interchange issue into the case.

CAB already has shown its approval of this device. It approved a Delta-TWA exchange at Cincinnati last winter, and earlier sanctioned a PAA-Panagra exchange at Balboa. Recently, on its own volition in an unprecedented action, it ordered an investigation into desirability of exchanging equipment in the Kansas City-Memphis case.

C. R. Smith, chairman of American Airlines, whose company would be hit hard competitively by a new southern transcontinental, strongly favors equipment exchange as an antidote for airline route expansion.

NWA Hawaii—CAB's decision granting Northwest Airlines a Hawaii route was dated March 16. It was approved by the White House late in July. Published insinuations that CAB changed its mind at the request of the President are not borne out. Actually, the White House sat on the case for months after it received the Board's recommended decision. Mr. Truman approved it shortly after his return from the Pacific Northwest. There is good reason to believe that at one time, earlier, he indicated that no company should be given the route. Incidentally, there are few better examples of political and local pressure forcing establishment of a route that had been termed impractical and unprofitable by the Board.

PAA Domestic Plans—Observers say Pan American is willing to have its domestic route applications linger until the Republicans enter office. PAA's influence in the GOP is considered here to be more promising than in the present administration.

Feeder Outlook—Don't expect any important cuts in feeder airline certificated mileage. Actually, it may increase. CAB generally realizes the importance of feeders in the national picture, admitting they are costly. It is agreed here that three year certificate periods are too short. One likelihood is that CAB will adopt the show cause procedure to listen to the individual lines' justification for renewed existence. The Board will have an opportunity to act on the certificate period, if it wishes, in the application of Pioneer for a permanent certificate. It could be argued, however, that Pioneer is not a true feeder. The industry believes the Board's Florida Airways Case will set the pattern for future feeder procedure. Meanwhile several feeder airline representatives met in Chicago to study problems of beginning service early next year.

Fewer Exemptions—Opinion here is that CAB will be tougher hereafter in granting exemptions. Instead of using this device to meet special cases of inequity, as it was intended, the exemption has been used too often to circumvent the act, it is pointed out.

Spin Requirements—CAA officials are still arguing over whether to take the spin test out of private pilot examinations. The Non-scheduled Flying Advisory Committee, which frequently carries the ball for such reforms, recommended recently to Administrator Rentzel that the spin requirement be removed from these tests. Conservatives in CAA still maintain they should continue unless the pilot is restricted to non-spinnable craft, and it now appears the conservatives will prevail.

CAA Shuffles—Predictions on this page July 12 that Stanley Bobskill, general counsel of CAA Region 1, is slated for general counsel's spot, were met with skepticism but it's still in the cards, although Bobskill may be placed in charge of the airport program before he gets the legal appointment. H. A. Hook is now assistant administrator for airports.

Echols Keeps Unity—For the first time in years, the Aircraft Trade Association has a president who is keeping the industry united. Gen. Echols retains the confidence not only of the highly individualistic members of his organization, but the respect of the Air Force, the Navy, and the Secretary of National Defense. These words are written after several months' observations and discussions with many industry and government officials, by an editor who originally was highly skeptical of the wisdom of the appointment.

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